

# AVIATION WEEK

NOV. 15, 1948

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## Inside Story of Stratocruiser's Range

One of the secrets of the Stratocruiser's amazing 4,200-mile range is 35 Pliocel fuel tanks in the giant wings. Pliocels are made by Goodyear of specially treated gas-tight nylon fabric.

They weigh only .080 lb. sq. ft.—

outlast heavier metal tanks—fit any size or space—provide maximum gas capacity—minimum weight. For the full story of Goodyear Pliocels, write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, Cal.



Pliocel—T.M. The Goodyear  
Tire & Rubber Company



MORE AIRCRAFT LAND ON GOODYEAR TIRES, TUBES,

WHEELS AND BRAKES THAN ON ANY OTHER KIND

# The FUEL GAGE that Always

## works...

# Now

## FITS ALL PLANES

Check these features  
with all other  
fuel gages

- The new Honeywell Fuel Gage gives a reading of temperature or air internally measured tank units to permit use with any type of fuel tank, including integral tanks.
- Low-level warning switch is positive in operation. Can be set for high-level action.
- Indicator is crash-tested because it's SCOTORIZED.
- Three-man mounting permits clearance effects of vibration and compression.
- Indicator is available in three dial diameters.
- Indicator pointer does not dance. Stable position when electrical power fails.
- Pointer uses composite bearing provided homogeneity under shockwaves and E.C. (vib).
- Vacuum tubes are of special ruggedized internal type.
- Points that has push-button are useful for checking operation in flight.
- Changing vacuum tubes does not affect calibration or accuracy.
- Shock-mounted power and plugs in for easy maintenance.
- The extreme accuracy of the system is not affected by constant increases of voltage and frequency.
- Performance is independent of cable length.
- System is easily calibrated with or without fuel in the tanks, and calibration does not drift.
- New tube waffle Honeywell tube connections are built and maintenance-free.



MINNEAPOLIS  
**Honeywell**  
AERONAUTICAL CONTROLS

# Now not to cook a pilot...

Take another look at the graph below!

It shows a new barrier to superheated light—the terribly high temperatures caused by air friction at high speed.

Cockpits in today's high-speed, high-flying planes would become oven-like pressure cookers if it were not for the air-exposure cooling system, developed and manufactured by AiResearch. One of these compact refrigeration units, weighing less than 15 pounds, can drop the temperature of air passing through it more than 500 degrees F.

Such AiResearch equipment is now in service on the majority of high-speed planes, including the Lockheed F-105,

Republic F-104 and North American F-105.

• To you—whatever your field—this specialized experience on compact turbines and compressors is now available. AiResearch engineers—designers of rotors operating in excess of 300,000 r.p.m.—also invite your toughest problems involving high-speed wheels; assemblies with high-speed rotors; air, gas and fluid heat exchangers; air pressure, temperature and other automatic controls.

Write: AiResearch Manufacturing Co.  
Los Angeles 35, California



100,000 80,000 60,000 40,000 20,000  
TEMPERATURE (°F)

In the F-105 engine No. 100,000 (first plane in chart) on a wall speed record at 40,000 ft. It was calculated that engine temperatures would be 1000° F. and actual temperatures would have exceeded 1000° F. if it had the AiResearch equipment.



**Picture of a Sky-Giant's Heartbeats**

**...the Sperry Engine Analyzer**

is engine performance. Sperry's engine analyzer, graph-like picture on the

This selection is unnecessary to all make possible higher depend

is engine performance. Should trouble develop, plug-like potatoes on the Android's swept spot in location and attitude will cover, precisely enough, to isolate one spark plug from causing the 3.0-liter's 224 or the Cosworth's 144.

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DIVISION OF THE SPERRY CORPORATION • GREAT NECK, N. Y.  
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This reduction in maintenance time will make possible tighter departure schedules, less cost and passenger stress and delay.

Sperry's Engine Analyzer is the first complete instrument provided for commercial aircraft to isolate detected engine difficulties. Now in full production for airline use, the Engine Analyzer takes its place beside the many other Sperry products designed to aid commercial aviation.

## New Prospects on Capitol Hill

There will be smoother sailing, less wrangling, no aviation crises in official Washington after the turn of the year. Democratic Congress will take over to work hand-in-hand with the Democratic administration. Policy shifts among Democrats on Capitol Hill and in the executive aviation agencies can be expected. But they will lack the mire of politically-colored rows. The inclination will be to ease pressure differentials within the Democratic family. Congressional Republicans will become armchair voters. But, as usual on which there is change in the Democratic ranks, there may be the *discrete* voice.

The substitution of a significant value

The Democratic lively spirit in Washington might affect the 78-Group Aet Fines program. When the administration and "no" to the fast step toward the program this year, GAO political leaders come out with an emphatic "yes". Congress some Democrats supported the program. But if the administration next year again says "no" to the program, the Democrats in Congress will listen attentively to its arguments. There are

(7) The resources expended for national defense thus can be supported by tax increases during the coming five-year \$15 billion. Under Defense Secretary James Forrestal's policy for the three years, USAF's allocation is insufficient for the second step toward a 70-Gm program. Growing the \$15 billion ceiling to provide additional USAF funds would leave Democrats with a budget deficit to explain—concomitantly. The proceeds would be publicly costly—cutting back popular public works and social programs, or increasing tax-based levies to increase government income.

(2) Adding a national defense burden exceeding \$10 billion to a booming economy, already had passed its first hump and domestic demands, now it means reversals to right wartime controls. Democrats turned the people's attention to controls in the 1946 election. Fomented has originated 78 GNP USAP would mean an over-all national defense program of \$15 billion (the latest estimate) to \$30 billion. This is similar to policy of limiting future Army and Navy activities with the USAP added in 1954, a budget

Congress likely will not make any material cuts in the administration's \$13 billion defense program, in the face of the high tension international situation. This will probably provide for a slight acceleration in the Navy's current \$1.5 billion program. Navy plans for a grandy-accelerated program do not have the Congressional support that a September 1954 law has.

There are confirmed proposals of the 75-Gang UNM among key Democrats in Congress, proposed to risk a counterproposal: Rep. Carl Vinson (D., Ga.), slated to become chairman of the House Armed Services Committee, and most of his committee members, Rep. Luther Hall (D., Ala.) as well as Rep. Mayfield (D., S.C.), members of Senate Armed Services Committee, Rep. Lyndon Johnson (D., Tex.), Senate chief and others. But the first decision will probably rest with party leaders, who have one eye fixed on the president's cabinet reorganization.

Best hope for the 70-Gross USAF lies in Everett's replacement—expected soon—with an un-circled Secretary who would reallocate the \$14 billion defense budget: one working sufficient funds for the USAF program. The third-best candidate for Everett's post are not likely to do

They are: Army Secretary Kenneth Royall, Navy Secretary John L. Sullivan, Secretary Frederick Elmscott, Navy paymaster Elmscott, now working out armed services organization for the House Committee, lately fought on equal status for USAF with the Army and Navy.

A fourth prospect, former interim Secretary Harold Ekers, is a question mark as far as military policy goes. His possible campaigning for Truman on West may be rewarded with that post. Strongly self, married by less or little else, Ekers is viewed as somewhat likely to succeed in someplace of importance of the "military" stream.

Democratic-controlled Civil Liberties Board, and Congressional Administration, an arm of the Democratic administration, will deal with a friendly Democratic Congress next year—instead of the disgraced GOP Congress of the past two years, which set up its own revision policy based to make an even survey of tribulation problems. The Democratic Congress will look to CAA and CAR to take the lead in establishing policy. Most CAA and CAR-sponsored bills will also through the legislative branch.

Catholics vote more, directed squad administrators have several action policies, can be expected to get results.

The administration's regulated campaign program has already resulted in some threat with little, if any, Congressional interference. Church members' presence is most likely for a showdown in 1962 when voters will go to the polls.

There are many reasons why Catholics are so important back into power in Congress in the mid sixties. GOP plans to investigate C&D and the reform will be dropped by next year's Democratic Congress. Investigators of Sen. James Phipps (R., Mich.) Senate Investigating Subcommittee have been looking for evidence of political influence in C&D divisions and data on religious activities in the past few years.

It is not clear whether or not the Catholic Church will ever be as successful at public hearings before it reaches its Democratic control in January.

President Taft has informed Congressional Democrats that he would veto legislation opening the airline field to foreign competitors. Democrats favorable to the proposition are so far from pushing it. Sen. Art Capper, with Wash. rights attorney Robert Klueh at the helm, is not to confront the issue, however.

The Democratic family split in Washington need not eternally wrangle over two equally emotional western issues. Regulation of contract carriers and interstate union of CAA and CAB. These are intra-family fights. CAA and CAB are split on both issues. Democrats in Congress, who divided, will have to decide between CAB's recommendations for rigid economic regulation of contract carriers and CAA and Commerce Department opposition. The desirability for realignment of functions has been credited on all sides, but CAA and CAB have been at odds on all conservation, economic

Another fight is still on over separation of powers and subsidy and payments to airlines. Pushed this year by Rep. Leland, this proposal has the support of Democrats on the House and Senate Appropriations Committee. With some hesitancy, President General Jose Donaldo endorsed it at a Congressional hearing. Sen-Ar Comstock will push the legislation—which Air Transport Association claims is aimed at making the airlines more of an airborne industry.

On your inspection of these controls, you will find that they are designed to meet the most exacting standards of reliability and safety.

## CONTROLS BY AEROTEC

...specifically designed  
for Military Aircraft...

Thousands of Aerotec Switches, Controls and Valves are used on fighters, bombers and other powered military aircraft today.

With the exception of land-based, these controls are used in the areas of mechanical, electrical and, in some cases, even in hydraulic systems.

The quality, in design and engineering, of Aerotec Switches has not changed, it is an acquired fact both by the Army, Navy and manufacturers of commercial planes. The same care that goes into these controls guarantees performance records in combat, is used in the construction of Aerotec equipment today.

A list of Aerotec equipment will be continuing.

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Belows type (controls manifold pressure)

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Close Junction Switch (1100F W.G. differential)

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Flow Valves

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Both as Army-Navy standards, these Controls, Switches and Valves are being installed on many of the latest type planes.

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## AVIATION CALENDAR

**Nov. 10-11—American Society for Testing Materials** ... materials production and safety ... New York, N.Y.

**Nov. 10-11—FABO** ... Federation of Aircraft Builders ... New York, N.Y.

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30-monthly valve tested in a valve tester with Cherry blind rivets in the base of the valve.



Cherry blind rivets used in a valve tester with Cherry blind rivets in the base of the valve.



Being tested in a valve tester with Cherry blind rivets in the base of the valve.



Second type Cherry blind rivets used in a valve tester with Cherry blind rivets in the base of the valve.

# CHERRY BLIND RIVETS

..... make the hard jobs easy

**REPRODUCTION IS PROHIBITED** Cherry Blind Rivets have production planning for difficult-to-reach blind spots in all types of assembly work. Fuselage, wing, tail group, and other aircraft assemblies are finished much faster with Cherry Rivets. Only one size is needed. There's no loading with Cherry Rivets. Cherry Blind Riveting gives you a complete finished assembly fully adapted to production-line assembly work.

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half-diameter and grip-length tolerances ... that meet more tolerance for all typical assembly jobs. Cherry Rivets are available in more rivet types, greater range of diameters, and the greatest number of grip lengths.

**COMPARISON TO SOLID RIVETS** Cherry Blind Rivets have their own advantages comparable to solid rivets. Excellent half-filling qualities insure vibration resistant joints. Cherry Rivets combine simplicity with strength ... the simplicity of their locking technique makes them a "wooden" on various production lines. Try Cherry Rivets today and you will see of less expensive, more efficient production assembly.

Cherry Rivets are made from aluminum alloy steel, or steel. Standard rivets are in the 1/8" to 1/2" size and the best rivets there is a wide range of grip lengths. Cherry Rivets, however, are made in 1/8" to 1/2" size and the best rivets there is a wide range of grip lengths. Cherry Rivets, however, are made in 1/8" to 1/2" size and the best rivets there is a wide range of grip lengths.

# Cherry Rivet

Company

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CHERRY RIVETS ARE APPROVED BY CIVIL AERONAUTICS AUTHORITY AND UNDERWRITERS LABORATORIES INC.

# Johns-Manville Products fly with the New B-36

## J-M PACKINGS, Gaskets and Asbestos Textiles help safeguard this great new bomber

**N**OW in full production for the Army Air Forces, the Consolidated Valves B-36 is produced by a number of flight-tested Johns-Manville products.

Expansion joints in the exhaust manifold system are tightly sealed with Johns-Manville Insulated Packing. This resilient packing, developed especially for this type of service, effectively withstands the combination of extreme temperatures, unusual corrosive conditions and severe vibration which would quickly reduce an ordinary packing to ashes.

For sealing flanges on the tanking and cabin heating and gas-cooling systems, Johns-Manville Gaskets of special design are used. These are made of tightly woven asbestos cloth coated on both sides with a flame-proof Neopren compound.

And for such jobs as wrapping fuel lines and fuel-cooling exhaust control lines within the engine exhaust, fire and flame resistant J-M Asbestos Textiles in the form of woven tape and tubing find many uses in Convair's new super-bomber.

Brochure AV-18 gives complete information about these and other Johns-Manville products for the aviation industry. For your copy, address Johns-Manville, Box 290, New York 16, N. Y.



—Johns-Manville—

### J-M PRODUCTS FOR THE AVIATION INDUSTRY

Packings and Gaskets • Friction Materials  
Insulations • Asbestos Textiles • Flexible Asbestos  
Tensile Pipe • Industrial Building Materials

## NEWS DIGEST

### DOMESTIC

USAF XR-12 rushed into Chevrolet City, near Elgin, Pa. The two-engine, high speed photo reconnaissance plane, built by Republic Aviation Corp., recently completed a most unusual high altitude photo mission and was the only plane of its kind in Air Force service. The other XR-12 is still at Republic's plant undergoing repairs at damage suffered when the one collapsed on a landing some months ago.

Douglas Blose, president of Tension, Inc., manufacturer of personnel and cargo line, died in Hawaii after a heart attack. He was 45 years old. He was a doctor and official of banking, trading and industrial firms.

Bernett E. Meyer's conviction for subornation of perjury was upheld by U. S. Court of Appeals. The former Air Force major general, now in the District of Columbia jail, had earlier won acquittal in court from his 30 months to five years sentence. The U. S. Supreme Court.

Construction was bid for first permanent building at New York International Airport (Midway). The three story, 50,000,000 building will be completed by spring and house Civil Aeronautics Administration and Weather Bureau offices.

Aircraft Industries Asia has lined its aircraft before its performance specifications for U. S. civil aircraft, covering 55 types, including 15 personal models, 16 transport, stages of concrete, and four helicopters.

### FINANCIAL

Boeing Airplane Co. reports loss of \$295,233 for nine months ended Sept. 13. Indicated third-quarter profit of \$775,693 (which closed down 11,074, 114 was reported in mid-year) is due to spread revision of prices on military contracts. Nine month sales rose \$71,404,550. Sept. 30 ending was \$327,859,800.

### FOREIGN

Switzerland's ABA airline has said four multimillion Douglas D-558 fighters to Australia for use as the government's special force Pacific region.

Bolton Airways Ltd. has been bought by British South American Airways. Bolson Airways operates scheduled service from Rome to other cities in the Balkans.

Great Britain has reported 17th jet engines to Russia and other countries not included in the five western European nations. Minister of Supply C. R. Smeaton told the House of Commons

## INDUSTRY OBSERVER

Don't be surprised if the Boeing XR-55, now designed for tailgating, finally comes up with tailgating power. USAF engineers reported last fall jet designs calculated by other aircraft manufacturers to give the medium bomber speed to Boeing's tailgating designs mainly because they were stripped of the range offered by tailgating. Rapid technical progress on tailgating is suggesting the range picture and discussion are underway on changing the XR-55 to tailgating. Manufacturers are eagerly submitting tailgating designs will be better if the USAF orders the XR-55 change without another design competition.

Revised Navy interest in airborne logistics will mean new life for the Glenn L. Martin Co. Navy project. Under current proposals Martin will re-evaluate its production line for the first flying boat transport in a joint line project to produce three or four line up of expanded emergency output. Main contract can take more powerful power plants including the Curtiss-Wright compound engine (Turbo-Cyclone 14) with assumed gross weights and payload (10,000) is now flying between San Francisco and Hawaii with a 30,000 lb payload. Using C-W compound engines the Navy gross could be boosted to 170,000 lb with a 45,000 lb payload.

Bellows has two new jet bomber projects in the mill. Armstrong Whitworth, which was conducting extensive research on turbofan aircraft, are working on an eight jet flying wing type bomber similar similar to Northrop's XB-46. Hamilton-Beir has a design for a four jet swept wing turbofan bomber now in the model stage.

Clara McCarthy, wealthy Texas socialite, hotel owner and travel promoter, is exploring the possibility of organizing an aerial space station plane in Houston, Texas. McCarthy sponsored three of the first four Braden men in last year's National Air Race and plans to build his Houston enterprise around a combination of racing, military or defense stations and an international gathering of aviation policy makers on the pattern of the National Aviation Clinic.

Northrop RB-49 photo-reconnaissance flying wings may be powered by the large Northrop turboprop 10,000 hp turboprop engine J. E. Northrop referred to the combination as an L-1000 of Congress officials and noted it would enable the wing to cruise at 500 mph. Most likely powerplant is a combination of both turboprop and straight turbojet engines, the latter shut down for long-range cruising and used only for climb and high-speed flight.

Pratt & Whitney and Instrument Corp. is developing a new "strike attack" engine for Tactical Air Force to avoid bomb damage done by jets, involving fighters and light bombers. The new engine will take 70 mm. patterns at the rate of five per second using cluster bombs up to 1,000 pounds.

Consolidated Valves' Cassin-Elliott now is flying with tandem extensions attached to engine jet thrust regenerative exhaust tubes. The extension is said to give satisfactory modification of the jet nozzle, possibly narrowing to counteract occupying state of the exhaust section of the exhaust. Tube extension 10% are being prepared for 76 Cassin-Elliotts already delivered.

Apparently abandoned is Consolidated Valves' use of exhaust gas shroud for exhaust burning of the Cassin-Elliott wing and tail structures. Army now is being heated by a thermal wall wrapped around regenerative exhaust tubes. This system has proved a temporary CAA approval, and probably will last half certificate following wing flights now under way. CAA objected to exhaust gas wing heating because of structural corrosion risks and the meaning of the water way by exhaust carbon, making inspection of affected structure difficult.



Sen. Milford Tydings



Sen. Edwin Johnson



Rep. Carl Vinson



Rep. Alfred Sweeney

## New Aviation Lineup In 81st Congress

In Senate, key men will be Johnson and Tydings. In House, Bulwinkle and Vinson.

Aviation interests will have a new slate of congressional personalities to deal with in January.

Republicans who headed key aviation committees in the House and Senate during the past four years will surrender their posts to Democrats. Committee staff members will make way for Democratic appointees. Democrats, instead of Republicans, will be in the majority on every committee of Congress. This means that any legislation will have to be Democratic-sponsored or approved.

**► Republican in Background—**Minor's Sen. Owen Brewster, South Dakota's Sen. Charles McNair, Massachusetts' Sen. Henry Cabot Lodge, California's Rep. Carl Hayden, Nebraska's Rep. Earl Staley and other Republicans who have served aviation legislation over the past ten years will already step into the background because of their knowledge of aviation problems, most of which are now parties, they will remain potent voices. But then will be in the minority.

Sen. Edwin Johnson (D., Colo.) is slated to take over chairmanship of Senate Interstate and Foreign Commerce Committee, which handles all civil aviation legislation, from Sen. Wallace White (R., Me.). White delegated his present aviation committee to Sen. Owen Brewster. Johnson will not. A member of the former Congressional Aviation Policy Board, Johnson has been active

on aviation matters and is likely to appoint himself chairman of Interstate's Aviation Subcommittee.

**► Other Prospects.** If he does not, there are three prospects for the post-Sen. Ernest McFarland (D., Ariz.), Sen. Winthrop Magnuson (D., Wash.) and Sen. Robert McNamara (D., Conn.). Although a member of the Aviation Policy Board, McNamara lacks aviation background and interest. Magnuson is probably the best educated, but his widely publicized stockholdings in Northwest Airlines rule against his appointment. McNamara's responsibility as chairman of the Congressional Atomic Energy Committee might preclude his appointment.

In addition, McNamara's support of chosen retirement legislation will lean at odds with Johnson, who led the opposition to the legislation in the last Congress. There will be at least two new Democrats named to Senate Inter-state and Foreign Commerce Committee staff to make a majority.

**► Revenue Out—**Aviation circles are speculating that Johnson will meet Brewster in Interstate's Aviation subcommittee. The two clashed bitterly over the chosen retirement proposal sponsored by Brewster and are personal antagonists.

On the GOP side of Senate Interstate, the lineup next year, in order of rank, will be Charles Taylor (R., N.H.), Clyde Reed (R., Conn.), Brewster, Claude

Cyphert (R., Ind.), Reed has been active in promoting air and rate increases and is generally considered a railroad sympathizer.

Three GOP committee members did not seek reelection: Wayne, Sen. Albert Hayden (N.Y.), Sen. Ted McNamara (Ind.).

Hayden's opposition killed all the choice retirement bill on committee. He also served as the aviation policy board. Moore is well respected for his avowed fight to block construction of the CAGD committee of John Lee, his predecessor in the Senate.

**► Bulwinkle Joins—**Chairmanship of House Interstate and Foreign Commerce Committee will shift from Rep. Charles Wolverton (R., N.Y.) to Rep. Robert Cramer (D., Ohio). Aviation leadership in the group will go from Rep. Carl Wendler (R., Calif.) to Rep. Alfred Bulwinkle (D., N.C.). Bulwinkle and Wendler have been eye-brow on all aviation problems from the committee, in the shift, policy-making will not be serious. Both have been a supporter in the aviation parties.

Two Democrats to enter year's House Interstate and Foreign Commerce Committee are Cramer and Bulwinkle, in order of rank. Lindsey Beckwith (Tex.), Percy Foret (Tenn.), Glen Hinkle (Neb.). On the Republican side, the top figure, after Wolverton and Wendler, Rep. Leonard Hall (N.Y.), Joseph O'Hara (Neb.), Wilson Galt (Pa.), and Robert Hale (Neb.).

**► Military Aviation—**Sen. Charles McNamara (D., Conn.) will have chief chairmanship of Senate Armed Services Committee in Sen. Milford Tydings (D., Md.).

Chairmanship of House Armed Services Committee will go from Congressman Ray Mather (Indiana (R., N.Y.) to successor Rep. Carl Vinson (D., Ga.). Vinson was pretty much solid the time in the committee this year, although not its chairman.

Tydings was a member of the former Senate Naval Affairs Committee and Vinson was chairman of the former House Naval Affairs Committee. Both sponsored the Navy case in fighting the 1946 Underwood Act. This year, Vinson championed the 70-Group Air Force program, over Navy opposition. Tydings also supported the 70-Group program.

**► Democratic—**Democrats on staff's Senate Armed Services Committee, in order of rank, Richard Russell (Ga.), Harry Reid (W.V.), Lester Hill (Mo.), Hiram Kilgore (W.V.), Barnet Mayhew (S.C.). Russell and Reid, his senior members, have been opposed toward a 70-Group Air Force. Hill and Mayhew have backed it strongly. Leading candidates for the Democratic victory on the committee are Magnuson and Rep. Lyndon Johnson (D., Tex.), both Senate elects. Both were active members of the former House Naval Affairs Committee, and Johnson this year was a member of House Armed Services Committee.

On the Republican side, leading members will be Cramer, Sikes, Bulwinkle (N.C.), Everett Sutherland (Mass.), Wayne Moore, Kent L. Kinnard, Baldwin (Kansas). Two high-ranking GOP members of the committee were wiped out in the election. Sen. George Wilson (Ind.) who was inactive, and Sen. Edward Robertson (Ill.), who has been the Navy's leading congressman.

**► House Committee—**On the House Armed Services Committee, Rep. Owen Brewster (D., Ind.) will be in place of the late Sen. John O'Donoghue, but become second-ranking member, and Rep. Paul Kelly (D., Tex.), a member of the aviation policy board, third ranking member. Brewster not only backed Vinson's fight for a 70-Group Air Force program in the last Congress, but opposed increasing the appropriations for it from \$522,000,000 to \$522,000,000. Chairmanship of Senate Appropriations Committee will go from Sen. Styles Bridges (R., N.H.) to Sen. Kenneth McKellar (D., Tenn.). Chairman of House Appropriations Committee will switch from Rep. John Taber (R., N.Y.) to Rep. Charles Cramer (D., Mo.).

**► Senate Key Man—**On the Senate side, leadership on aviation appropriations will rest with Tydings and Russell, but within on the Armed Services Committee, as well as the Appropriations Committee. Sen. Ernest Brown (D., Ga.), however, has an edge for the chairmanship of the Military Appropriations Committee. In the last Democratic-controlled Congress he was chairman of the Army Appropriations subcommittee.

On the House side chairmanship of the Military Appropriations subcommittee will probably go to either Rep. John Key (D., N.C.) or Rep. Harry Shipley (D., Calif.). In the last Democratic Congress, Key headed the Army Appropriations subcommittee and Shipley led the Navy Appropriations subcommittee.

**► McGowan's Post—**Sen. Pat McGowan (D., Nev.), one of the most active members of Congress on civil aviation mat-

ters, will be faced to vacate a spot on Senate Interstate and Foreign Commerce Committee by the Congressmen. Recognizing that Inter-state membership to two committees, is slated to become chairman of the Senate Appropriations subcommittee on Civil Aviation Administration and Civil Aviation Board budgets. McGowan can be counted on to avoid subcommittee influence over commercial aviation developments through his promising stated post.

### ALFA Convention

As Late Flight Association opened to hold the largest convention at its hotel in Chicago last week with 170 delegates from 31 local ALFA councils representing pilots of 28 states.

President David L. Bulwinkle said about 50 percent of the convention's time would be devoted to a study of air safety and methods of improving it. In addition, a president, first vice president, secretary, treasurer and 10 regional vice presidents will be elected for two-year terms.

Founded in 1930 and chartered in 1931, ALFA says its present membership stands at 6725 and includes 97 percent of the nation's scheduled air line pilots. ALFA states it represents pilots of three current Alaskan Airlines, American Airlines, Delta, Northwest, Transcontinental, Eastern, Empire, West Coast, Midwest, Florida, Northeast, Northwest, Pan American, Frontier, Frontier Capital TWA, United, TWA, West Coast, Transcontinental, and Trans-Texas.



NAVY'S BIGGEST CARRIER PLANE IN TAKEOFF

Navy added strength to its "big carrier" concept recently by having two Lockheed F-105 fighters of the deck of the new Essex-class ship, the USS Essex (CV-9), at sea.

Capt. J. W. the largest aircraft to leave a carrier's deck in take-off. When Commander F. D. Davis, based for his command of the "Trenton" fleet, language light,

mounted eight F-105 fighters stopped in the hangar of the JFV the plane was as heavy as a half-ton. No strength was made to remove the plane.

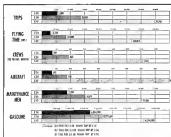


Chart shows monthly totals to November 1980 for daily late into Berlin

## Airlift Prepares for Bad Weather

Most winter flights must be made on instruments; new field and navigation aids added to Berlin facilities.

The Allied airlift to Berlin has moved into the critical winter weather phase. U.S. Air Force long range weather forecasts indicate that instrument flight will be necessary for more than two-thirds of November/February period in the Berlin/Brandenburg area.

■ **Bad Weather Periods:** As of last week the airlift had deposited 145,154 tons of cargo in Berlin. Of this total 514,594 tons were flown by USAF aircraft with the Royal Air Force following with 163,000 tons. During October the Allied airlift averaged delivery of 3700 tons daily to Berlin. During the first week of November during which bad weather predominated, deliveries dropped to a 1500 ton daily average. For a 10-day period of unbroken instrument weather from Oct. 25-Nov. 5 the airlift averaged 1150 tons daily to Berlin.

Refueling during the winter guard the airlift using new tactics to boost its all-weather flying record. Weatherization of the airlift planes was meeting completion at bases in western Germany including switch to cold weather hydraulic fluids and lubricants and installation of deicing equipment.

■ **High Intensity Lights:** At Tempelhof a second set of 40 VEGA high intensity approach lights was being installed to make a 300 ft approach line to the instrument landing runway. These lights will reduce darkness visibility minimum to one eighth of a mile. The latest

type of military GCA is now in operation at Tempelhof permitting briefing of two gliders at a time on final approach. New VHF two channel flight (not as little five channel) has been replaced the low frequency band communication system in the command to Berlin.

The newly constructed Tempelhof opened at 0800 ft runway for operations last week to augment the capacity of Tempelhof and Gatow fields in the Allied sector of Berlin.

■ **More Flares:** Meanwhile both USAF and RAF were moving additional equipment to boost the airlift. British added eight Hercules HC-40 transport aircraft to its airlift contingent last week. The Hercules has a 30 ton payload. First of 24 Navy C-54s went into service on the USAF lift last week. The Navy can transport 10 tons of cargo.

Transport Service consists of VNA 6 formerly operating from Hoesel and VNA 8 formerly flying from Garm to Aachen. The two Navy squadrons were replaced by MATS by a Marine transport squadron (VNA 4) equipped with C-54s to operate Pacific routes. Navy is currently personnel of its transport squadron operating on the direct Frankfurt-Berlin route and on the North Atlantic support route to fall for aircraft and maintenance activities performed from command to support the airlift's continued.

■ **Naval C-54s:** The 24 Navy C-54s

currently committed to the airlift leave MATS with the job of flying in the winter. 41 C-54s to make up the 60 plane increase promised Gen. Clay during his October trip to Washington. Five Fairchild F-44s (C-42) are continuing on the lift to meet holiday freight.

MATS is flying two C-74s round trip across the Atlantic weekly in support of the airlift. Half of the seven C-74s now operating in MATS are still being used on Caribbean routes.

## Small Firms Told To Get Arms Work

Robert P. Peterson, former Secretary of War, has told small business it should join the procurement program for its own good (Airlift/Nov. 10).

Peterson, who had been in charge of procurement when Undersecretary of War, warned that "if they neglect to do so, they are likely to find some of their existing markets eroded and will forfeit the advantage of this market for their products."

In a speech in New York before the National Conference of Commercially Available Companies, Inc., he pointed out that the huge sum of \$15 billion to be spent for military defense "is bound to have an effect on our trade and commerce that we will not resist... and will... divert ourselves from production of civilian goods and consumer goods needed by our people." But as this "diversion" occurs would be in fairly small ways.

■ **Industrial Drive:** He predicted that the draw on our industrial plant will be serious, causing some hard and unpleasant problems. The solution, he said, may involve strictness of materials higher taxes and stricter controls on credit.

Peterson went on to describe the part Congress, the Munitions Board and the State Secretariat will take in the procurement system. He emphasized that the "actual placing of contracts will be awarded to the free market system. He said it is not in favor of a "super department" purchasing branch for the entire military establishment.

He recalled that purchase by advertisement bidding was at many times discarded during the war because of the immediate need for certain materials. Contracts made by informal bidding, or even across the table, were permitted.

Peterson warned the group that "small business will find the pioneering branches in the Army, Navy and Air motivated and cooperative. Advance payments will be available in private contracts and in government contracts. The best time for small business to get into the business to do many of our smaller contracts will be in the early 1960s."

## Winter Service

ATA authority says weather will cause no major schedule breaks.

By Robert Skote

Predictions that the airlines will cope with the coming winter bad weather season without major schedule interruptions was made last week by Milton W. Arnold, Air Transport Association vice president for operations and equipment.

■ **ATA's Prediction:** He predicted it will be evidence of shuffling progress in airline operating techniques during the next two years. A previous ATA study has indicated that during 1946 the airlines lost nearly \$40,000,000 due to flight delays and cancellations caused by bad weather.

■ **Equipment Continued:** Arnold pointed to production on the new very high frequency communication equipment. ■ **VHF radio band:** Arnold said that the VHF radio band is being used in the field approach level. GCA traffic control at Chicago cited that this device is not necessary when search radar can be used for traffic control.

In remarks prepared for delivery at a New York press meeting, Arnold said that airline delays of all types had been reduced by about 50 percent during the first nine months of 1960. Delays due to weather have been cut 60 percent, average delays, 42 percent, cargo handling delays, 34 percent.

■ **LaGuardia:** He noted that LaGuardia, which processes 12 percent of the nation's air traffic and is generally credited to have the worst air traffic congestion problems, was cited by Arnold to illustrate the beneficial effect that new equipment and procedures are already having on operations. He pointed out that in the winter of 1946-47 87 percent of all winter cancellations during nationwide weather at LaGuardia were delayed or cancelled solely because of air traffic congestion. Total of 1873 flights were delayed, 45,163 passengers had to be sent off as more weather to land at LaGuardia because of traffic congestion. During the more recent a year later not a single flight was cancelled due to traffic congestion and only 21 percent were delayed from time to time, he claimed.

During the 1946-47 period 933 flights were delayed for an average of 51 minutes per plane. A year later only 105 flights were delayed for an average of only 11 minutes per plane.

Arnold outlined the advanced traffic handling equipment at LaGuardia to three steps taken by the Civil Aeronautics Administration and the airlines.

■ **Installation of ILS:** This automated a

straight-in approach for the landing of a red-eye jet down procedure. Effectiveness of the ILS shows what data concentrated landings in the opposite direction from that in which the station was installed was obtained by using the back course of the localizer plus a portable glide path installation located in the opposite direction from the passenger glide path. This technique is also used at Chicago Municipal Airport.

■ **Installation of CCA:** This gave the control tower a picture of the approach area for the first time and enabled them to control traffic more effectively by directing approaching planes into the appropriate landing runway faster and clearing departing aircraft away from landing slot holding paths.

■ **Rehearsal of Holding Stacks:** Arnold said that the airlines are in the process of rehearsing holding stacks in the approach to reduce time required from leaving the stack to making a landing. Holding patterns were also made smaller and more precise to allow pilots to get into their landing slots faster.

■ **Use of an Automatic Approach Controller:** This device is similar to an autopilot system in the field approach level. CAA traffic controller at Chicago cited that this device is not necessary when search radar can be used for traffic control.

■ **Use of VHF Radio Communication:** Doolittle of VHF radio frequencies available in traffic control that development of a system of holding planes through approach control started in speaking up the flow of air traffic. The U.S. Air Force has been using a system of this type but based on a more elaborate

radio system (CIPN-10) central tower personnel was also increased at LaGuardia.

■ **Establishment of Delicate Traffic Lane:** A system of approach and departure was established for all airports in the New York metropolitan area that separated traffic destined for various airports and also separated arriving and departing traffic for the same area. All of these measures increased the capacity of the air traffic control system under maximum flying conditions by 100 percent in the New York area, Arnold said. A more conservative estimate of improvement possible with the equipment used by Arnold was made recently by the Radio Technical Commission for Aeronautics which reported an increased efficiency of about 25 percent would be possible under these conditions.

## Damon Heads ANDB

Ralph Damon, president of American Airlines, was named last week to lead the Air Navigation Development Board that will guide a billion dollar, joint military and civilian program and traffic control system. Damon previously was chairman of an ad hoc committee on migration of the Research and Development Board that drew up the original plan for administering the program. American Airlines, Agt. 10, Douglas. ■ **Evening of the Navy Corp of America:** was appointed director of development for the ANDB. A staff of five electronic engineers will be selected by the board about Dec. 1 to work under Damon.



TRAGER GETS MACKAY CITATION

Capt. Chester Trager, first pilot to fly a plane down the tip of mud (Airlift/Nov. 10, 1960), receives a framed citation for the Mackay trophy award at Air National Command Center

Gen. Wright Clark, Gen. L. G. W. Calkins, Agt. 1000 commanding general. Citation presented Trager's first appearance in the 10th X-1 aircraft plane in the most dangerous flight of the year.



## More About the X-1 . . .

The X-1, three years after its construction and nearly two years after its first flight, continues to be a mine of new information for the cognate. Despite release of many facts by the Air Force and the National Advisory Committee for Aeronautics, and a detailed report on the plane in *Airman* from June 25 and other issues, new data on the X-1 still turn up.

Stanley W. Smith, Bell Aircraft Corp.'s project engineer on the airplane, and Capt. Charles E. Yeager, the USAF pilot who first flew it faster than sound, recently discussed the craft at a meeting in New York of the Institute of the Aeronautical Sciences. At this meeting and a news conference preceding it, *Airman*'s West's editorial editor Irving Stone gleaned these hitherto-known facts about the X-1:

- In trials of the X-1, sound speed has been measured on 10 to 15 occasions.
- The craft has been taken to well above 60,000 ft. At this a record, though not official, jet-powered airplane.
- The X-1 has been flown vertically heads up and tails up.
- With gear and flaps up, the craft stalls out at 240 mph, indicated.
- Three most important maintenance items as that plane on the Mach seven, inspired interest, and attention.
- The X-1 has more thrust per pound of airplane weight than any other craft: This is considered the deciding factor in being able to attain such sound speed.
- Aided if he's rather by an F-101 or the X-1 in combat, Capt. Yeager (a former Mustang pilot) unfortunately claims the Mustang's behavior was "horrendously slow."
- "Maybe it would be a good idea to sign up for a X-1 service—then you'd be sure to stay in the States."
- By effect, there is the key as to why the X-1 design is far from that of a powered machine (it disintegrated from its value to research)—not enough fuel can be stored to provide reasonable range.
- To increase the research potential of this type of craft, more fuel capacity will be required. But the given due to a propulsive system had been tested under more than five hundred, more than seven hundred, and more than eight hundred fuel loads.
- Capt. Yeager has been piloting the X-1 for about 16 months, has flown the craft about 30 times, but this has meant comparatively little flight time—only 4 to 5 hours.
- With all engines operating, the X-1's fuel consumption is 155 gal in 25 min.
- Specific fuel consumption is

## Record Flights

Radar suggested as new timing device to eliminate low level flying.

International network of modern routes, Philadelphia Airway (high altitude) network, has been made to lower per mile of speed record flights to permit use of radio-aided and tracking devices, in record-making planes and the dangerous low level flying, reported for visual recording methods used. National Aeronautics Association open activities occurring from the record. F-101, F-102, F-104, F-105, F-106, F-107, F-108, F-109, F-110, F-111, F-112, F-113, F-114, F-115, F-116, F-117, F-118, F-119, F-120, F-121, F-122, F-123, F-124, F-125, F-126, F-127, F-128, F-129, F-130, F-131, F-132, F-133, F-134, F-135, F-136, F-137, F-138, F-139, F-140, F-141, F-142, F-143, F-144, F-145, F-146, F-147, F-148, F-149, F-150, F-151, F-152, F-153, F-154, F-155, F-156, F-157, F-158, F-159, F-160, F-161, F-162, F-163, F-164, F-165, F-166, F-167, F-168, F-169, F-170, F-171, F-172, F-173, F-174, F-175, F-176, F-177, F-178, F-179, F-180, F-181, F-182, F-183, F-184, F-185, F-186, F-187, F-188, F-189, F-190, F-191, F-192, F-193, F-194, F-195, F-196, F-197, F-198, F-199, F-200, F-201, F-202, F-203, F-204, F-205, F-206, F-207, F-208, F-209, F-210, F-211, F-212, F-213, F-214, F-215, F-216, F-217, F-218, F-219, F-220, F-221, F-222, F-223, F-224, F-225, F-226, F-227, F-228, F-229, F-230, F-231, F-232, F-233, F-234, F-235, F-236, F-237, F-238, F-239, F-240, F-241, F-242, F-243, F-244, 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F-1840, F-1841, F-1842, F-1843, F-1844, F-1845, F-1846, F-1847, F-1848, F-1849, F-1850, F-1851, F-1852, F-1853, F-1854, F-1855, F-1856, F-1857

## Airline 'Wing'?

**Signs indicate Northrop giving serious thought to all-wing jet transport.**

Proposals for a Flying Wing jet transport, perhaps adopted from the eight jet B-49, apparently are ripening at Northrop Aircraft, Inc.

While the Hawthorne, Calif., firm's aircraft generally has been controversial to its publicity or development just to come, it recently has sponsored several significant reports on the future of all-wing aircraft for transport purposes.

More than a year ago, John E. Northrop, in his Wilbur Wright Memorial Lecture in London, discussed a B-55B-49 used as wing transport to carry 50 passengers and 40,000-50,000 lb. of cargo. Except for that (and an airline's exception for Pacific mail), the company has dealt with the wing transport idea somewhat abstractly.

But now—New, however, it looks like the build-up has started for some time. The company's plant expansion not so long ago published a special report on color showing studies for passenger cabin arrangements of such a plane. In addition, Northrop vice president John W. Myers, has discussed a Flying

Wing transport in detail to the Southern California chapter of the National Aeronautics Association.

Myers said that possible versions of the Flying Wing could only be adapted from the B-49. He added "Paraglider Air Force sponsorship has enabled me to present a picture of the wing transport as a bomber can be had in other type or plane as well."

Performance—USAF release recently of the endurances performance of the B-49 and the development of the Flying Wing transport "models" in the jet bomber. Such a plane would carry 60 passengers and two tons of freight from New York to Los Angeles in 3 hr., 50 min.

Myers said the direct operating cost of the trip would be about \$16 per passenger and baggage. Further, he indicated Flying Wings costing 300,000 lb. and capable of carrying the one ton of cargo in low as \$1 million per ton.

To obtain these detailed estimates, Northrop obviously has taken a critical look at the transport possibilities of a jet Flying Wing. With engineering and testing costs at the B-49 of \$100 million (a large increase by the B-49 plane Air Force order), Northrop seems to be in a

good position to have a military design with a commercial plane at minimum cost. Probably no other manufacturer today has a jet bomber which could lend itself as readily to commercial modification.

## Boring Calls for Help

With employment at its Seattle Works, plant steadily in excess of 20,000, the Boeing Aircraft Co. issued a call for 3000 additional men to fill immediate needs and acknowledged that additional requirements beyond this figure may develop before the start of the year.

The company's expanded repair and production programs were cited as reasons for the increased requirements. The Stratofortress, B-58 and C-97 are in production while the X-45 and various jet projects are included in the experimental program.

Boring's Seattle payroll now exceeds \$6,000,000 a month. Present employment is the highest since wartime and compares with total employment of 75,000 in all of 1945, below the strike which ended last month.

## PRODUCTION BRIEFING

**Consolidated Value Aircraft Corp.**, San Diego, has completed delivery of the last of the Convair-Learners ordered by Coastairline Airbanc. Convair now has delivered 76 of the transports, including two executive types.

**Kanawha Aircraft Corp.**, Windsor Locks, Conn., expects CAA certification of its K-150 executive helicopter within 60 days and has already begun building structures and fitting subcomponents for components of its last production craft. Company expects to have six engines in service by spring.

**Jack & Harris Precision Industries, Inc.**, Cincinnati, has produced five White Aircraft Administration machines and equipment currently valued at over \$1,600,000. The equipment has been used. JAH also is negotiating with WAA for purchase of additional factory space.

**Kanawha Aircraft Corp.**, Windsor Locks, Conn., has received a new Navy contract for developing information on helicopter flight characteristics of stability, control and handling.

**McDonnell Aircraft Corp.**, St. Louis, proposed Knudsen-Pedersen from chief engineers to assist in the new production engineering. R. J. Eaglehart has production manager to executive.

**Ede Corp.**, College Point, N. Y., appointed Kenneth D. Venter director of sales regional. He has been with Ede since the company's founding in 1925.



TF-80C ROLLING

On the "temporary" production line, Lockheed Aircraft now is in full production of its latest dual-control TF-80C.



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## ENGINEERING



### Hawker: Britain's Fastest Plane

High speed is complemented by long range attained with split ducting permitting increased fuel storage.

(McGraw-Hill World News)

LONDON—Probably Britain's latest fighter is the new Hawker jet, designed to a specification laid down in 1946.

Built as a carrier-based plane, this folding-wing craft, the N746, is extremely sturdy in construction—however close a comparable land-based fighter aircraft.

► **Naval, RAF Interest**—The Navy is reported much impressed with the plane, but it has not yet been ordered, although it made its first flight in September, 1947.

The RAF may also buy it, as a slightly lighter construction without folding wings and another look. Appearance of this version, the P1046, at the same as the N746 shown in the accompanying

ing photos on this page.

Fuel that the services are still considering the plane is evident from the fact that specific details of performance or construction have not as yet been disclosed.

► **Speed Feat**—The Hawker N746 has now flown well over 50 hr, many of those at close to its maximum speed. That is officially stated as "over 600 mph," but it is believed that it will exceed 670 mph.

Power plant is a Rolls-Royce Merit development, 1800-hp liquid.

► **Light Landing**—Air inlets have been split and moved back to the wing roots, and jet outlets have also been split and moved forward to wing root trailing edge. The wing root section has been modified to accommodate the escape

route. This form of installation would be possible only with a crash-type jet with severe flow, no mid-flow jet component could be fitted as so short a span.

► **Range Boosted**—Main advantage gained with use of the split inlets and exhausts is stated by Hawker personnel to allow more room in the fuselage, both forward and aft of the engine for fuel.

As a result, range of the N746 is officially "well beyond that of any other Royal fighter" and, unofficially, between three and four times, or nearly double that of present British jet fighters. Estimate is 1750 mi.

► **Performance Witnessed**—An Army Corps War Office observer at a demonstration flight at the Langley Aerodrome reports a very favorable handling performance—a series of three 360-deg rolls at well below 500 ft, very steady inverted flight at about 150 ft, well-coordinated Immelmann, and a few more climb after coming in level.

Span of the craft is 164 ft, length 35 ft 4 in. The Hawker has extremely narrow underwing-track—less than the 5 ft wide main landing track used by the Navy.

Crews is jettable, and cockpit is fitted with an ejection seat.

First public appearance of the plane was at the Society of British Aircraft Constructors' show at Farnborough last September.

The craft was designed by Sidney Camm, center of the Hurricane, Spitfire, Tempest and Fury, who says that he has risen well beyond the Hawker N746 in his present design.

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AVIATION WEEK, November 15, 1948

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## Industry Seeks Ideal No-Fire Hydraulics

High performance seen as other prime factor for new medium.

By Robert McLawrie

Although hydraulic fluid at the type currently in use constitutes a far less serious fire hazard than the fuels and lubricants caused aboard aircraft, its flammability has long been a safety factor in a considerable number of aircraft fires in recent years.

A Royal Air Force survey, taken in 1943, of combat losses resulting from fire disclosed that between 2 and 3 per cent of such losses were traceable to hydraulic fluid.

Then aviation created an interest in the British Army, Air Force and Naval Aviation that has given impetus to the present broad research program in non-flammable hydraulic fluid.

Based interest—On the civil side, the flammability of hydraulic fluids contributed to the introduction of a series of laws in the early second Lockheed Constellation, particularly the forced landing at a Constellation at Williamsport, Pa., in the summer of 1946, after a broken disc shut off the compression control of hydraulic line. In the ground up of the planes that followed this and other fires, one of the modifications was to prevent hydraulic fluid leakage.

Following this, both the Air Transport Association and the Aircraft Industries Association formed subcommittees to investigate the requirements for a non-flammable fluid.

The program has been continually expanded until all of the various segments of the U. S. aviation activity are now working participants. These include USAAF, Naval Aviation, Civil Aeronautics Administration, AEA, AIA, and the National Advisory Committee for Aeronautics.

But to date there is no non-flammable hydraulic fluid fully approved for use by all or even a majority of these groups, although several formulations have met with official approval.

Viewpoints differ—Basic problem is to create a fluid which is both non-flammable and possesses satisfactory operating characteristics for aircraft systems.

Each of the groups mentioned have placed varying emphasis on these two basic requirements, and it is this difference as to objective that contributes the existing lack of unanimity among them.

The Air Force is adamant that there be no compromise with the existing performance requirements (Specification

### Nonflammable Hydraulic Fluid (General Requirements)

#### VISCOSITY

**Air Force:** Satisfactory operation over a range of  $-65$  to  $160$  F.  
**Industry:** No upper limit requirements, but satisfactory operation to  $-40$  F.

**Air Force:** Minimum viscosity at  $110$  F. of 9 centipoise and maximum viscosity at  $-60$  F. of 130 centipoise.

**Industry:** Viscosity at  $-40$  F. at 1800 centipoise for all commercial aircraft and 2000 to 7000 centipoise for certain other types.

Note: Centipoise is a measure of the viscosity of a fluid flowing slowly through a long tube. Centipoise is viscosity measured with a small plunger forcing the fluid under action of gravity. There is no convenient conversion factor between the two.

#### PUMP WEAR

**Air Force:** This characteristic will be determined by wear measurements on pump through which fluid has been run at 3000 p.s.i. at 200 F. for 100 hr.

**Industry:** Determined by wear measurements on a pump through which the fluid has been run at 3000 p.s.i. at 150 F. for 30,000 cycles. Note: Wear indicator weights lost in oil bearing, cylinder block, and turbine thrust function, evidence of corrosion on pump bearings, excessive looseness at piston knuckle joints and scoring on thrust plate.

#### COMPATIBILITY

**Air Force and Industry:** Both groups require that the new fluid be compatible with existing fluids. Industry requires that new fluid be compatible with at least ten percent of old fluids to permit system change over with a minimum of difficulty. New fluid must be stable in all proportions with old fluid, from  $-65$  to  $160$  F.

#### FLAMMABILITY

**Air Force and Industry:** Both groups in agreement on test method proposed by AIA including system of oil-soaked cotton file cord, spraying of fluid on, burning oil-soaked rag and ignition of high pressure fluid spray. These tests are qualitative only with results such as "will not ignite," "flashes with difficulty," "flashes readily," etc.

In addition, the Air Force requires (1) that the fluid not ignite spontaneously at any temperature below 3000 F., and (2) a 54 cal. gasifier test, which it will conduct upon request.

#### OXYGEN DEMAND

**Air Force:** Percentage oxygen required for flame propagation will be limited to a maximum of 50 percent for any proposed fluid.  
**Industry:** Percentage required for propagation shall be 50 percent minimum.

#### TOXICITY

**Air Force and Industry:** Both groups require not toxicity properties of the new fluid, although specific requirements for this consideration are difficult to formulate.

AN-VVO-160, once fluid prepared to this specification, and currently in use throughout the service and the airlines, has proved satisfactory over the widest range of conditions, both at temperatures and geographic, yet untested.

But, therefore, greatly concerned over the trend to all non-flammable fluids developed to date towards important as performance is a parsimonious price to pay for safety characteristics.

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were experienced in engine and pump assemblies, and both the automotive and airline industries are willing to accept these fluids having a performance considerably less required than those required by the services. The three greatest sources of approach by the Air Force, Navy and the civil groups is outlined below.

► **Air Force Study**—The Air Force, following completion of the British report as well as studies of its own CMOA of Flying Safety, initiated a nonflammable fluid program in the National Defense Research Council, and a grant was issued under the direction of Dr. H. R. Finkle.

When the NDRC was organized in 1945, the Air Force, in cooperation with the Navy Bureau of Ordnance, formulated the program into a research contract with the Petroleum Refining Laboratory, Pennsylvania State College. In addition, with an invitation of the Materials Laboratory, Air Materiel Command, Wright Field.

This program had for its objective the collection of an entirely new base stock, for hydraulic fluid to replace the petroleum base previously used.

During the course of the program, such materials as ester glycol, esters, triethyl phosphate esters, ether and ester, organic alloy esters, dibase and ester and various delugated oils were very investigated.

Although each displayed promising characteristics, none proved of sufficient merit to warrant further consideration and the Air Force has largely abandoned this approach in favor of the development of "milder" materials which can be used with the existing hydraulic fluid.

If such materials can be developed, it feels that the problem of hydraulic fluid supply can be simplified greatly since it will require only the addition of the new material to the current production charge handling one separator of a tried and proven fluid.

Although a number of promising materials have been developed they have proved costly and are not readily available either in nature or in production. However, work along this line to date has convinced the Air Force that such materials can be developed and that their use will provide the required nonflammability characteristics with no impairment in the performance of AN-VVO 568 fluid.

► **Navy Fluid**—Navy Aviation has continued the original substitute base stock approach and has developed a nonflammable hydraulic fluid which has the complete approval.

Known as "Hydralite EA," the new fluid has passed a wide variety of laboratory tests and received a thorough service test in use aboard a squadron of Vought F4U Corsair fighters. It is now



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## Reveal Increased Turboprop Efficiencies

Errors seen in present calculations for turboprop versus turbojet.

By Ives H. Briggs\*

Engineering studies to date have usually shown that the turboprop engine exceeds its maximum efficiency at about 200 mph.

For higher speeds, engineers have indicated that the turbojet is a more efficient propulsion unit.

In the current research and development program have been confined to these propulsive units, and design planning engineers on new aircraft usually select one or the other of these power plants on the basis of the design speed being either below or above this 200-mph value.

In the author's opinion, this arbitrary dividing line is much too low and the turboprop engine is being penalized because of inaccurate efficiency calculations.

Actually, the speed at which turboprop efficiency falls below that of the turbojet is much higher than has been supposed. This is because, as a large number of comparisons have not been drawn from analyses made on a common basis.

**Efficiencies Defined**—Jet propulsion efficiency is normally defined as the ratio between power available for propelling the airplane and power added in the system by the fuel.

Propeller efficiency is the ratio between the power available for propelling the aircraft and the total power in the system used in driving the shaft.

It is evident that these definitions are not uniform, since useful thrust power is divided by different quantities in each case.

**Equation Developed**—In a turboprop engine,

$$\eta_p = \frac{P_p}{P_p + P_t} \quad (1)$$

= Power in moving jet stream ft-lb / sec.

Then

$$\eta_p = \frac{P_p}{P_p + P_t} \quad (2)$$

Since

$$P_p = \frac{W_p}{g} V_p (V_p - V_0) \quad (3)$$

$$P_t = \frac{W_t}{g} V_t (V_t - V_0) \quad (4)$$

Now

\*Aviation Research Division, Bureau of Aeronautics, Department of the Navy

### Symbols For This Analysis

- $\eta_{tp}$  = Propulsive efficiency of jet
- $\eta_{tp}$  = Propulsive efficiency of turboprop
- $\eta_p$  = Propulsive efficiency of propeller alone
- $\eta_t$  = Efficiency of turbine which drives the prop
- $\eta_{tp}$  = Mechanical efficiency of prop
- $\eta_p$  = Mechanical efficiency of jet engine
- $\eta_t$  = Speed of jet out nozzle, ft/sec
- $\eta_p$  = Speed of propeller, ft/sec
- $\eta_t$  = Loss between ideal energy available and that used in driving the prop and propeller in a turboprop engine. (This factor is  $\eta_{tp}$ ,  $\eta_p$ , or  $\eta_t$  as necessary, since it is not practical, or desirable, to show all available points in the specific-driving analysis.)
- $P_p$  = Total power available in the engine, ft-lb/sec
- $P_t$  = Total power available in the engine, ft-lb/sec
- $P_p$  = Power used for propelling, ft-lb/sec
- $P_t$  = Power in moving jet stream, ft-lb/sec
- $P_p$  = Power added by engine, ft-lb/sec
- $W_p$  = Weight of gas flowing through engine per sec, lb/sec
- $W_t$  = Weight of jet flowing, lb/sec
- $V_p$  = Velocity of jet out, ft/sec
- $V_t$  = Jet velocity applied by turbofan unit

$$P_p = P_t = \frac{W_p}{g} V_p^2 \quad (5)$$

Since  $\frac{W_p}{g} V_p^2$  = Power available in the system entering engine, ft-lb/sec

Then

$$\eta_p = \frac{P_p}{P_p + P_t} \quad (6)$$

$$= \frac{W_p V_p^2}{W_p V_p^2 + W_t V_t^2} \quad (7)$$

$$= \frac{W_p V_p^2}{W_p V_p^2 + W_t V_t^2} \quad (8)$$

If the jet efficiency,  $\eta_t$ , is assumed to be unity, then

$$\eta_p = \frac{W_p}{W_p + W_t} \quad (9)$$

This is the equation for jet propulsive efficiency that is normally employed. But, as a definition of efficiency that compares fairly must be desired.

For instance, if  $\eta_t$  equals  $\eta_p$ , the efficiency is 100%, but from Eq 2 the propulsive power is zero.

Also, if  $\eta_t$  is less than  $\eta_p$ ,  $\eta_p$  is greater than 100% and the value of  $P_t$  becomes negative.

A definition is needed that makes  $\eta_p$  equal zero when  $P_t$  is zero, and negative when  $P_t$  is negative. This appears the only way to avoid confusion.

As evidence for the propulsive efficiency of a turboprop engine it derived in similar manner from the definition mentioned above.

$$\eta_p = \frac{P_p}{P_p + P_t} \quad (10)$$

$$= \frac{W_p V_p^2}{W_p V_p^2 + W_t V_t^2} \quad (11)$$

By inspection of Eq 6, it is evident

That equation reduces to

$$\eta_p = \frac{W_p}{W_p + W_t} \quad (12)$$

**Comparisons Made**—As previously stated, Eq 4 and 6 are not comparable because the denominators used in the two cases is different for the jet, the power added,  $(P_p - (W_p/g)V_p^2)$ , was employed in the denominator, while in the other equation only total power  $(P_p)$  was used.

This is seemingly an unfair comparison, since a smaller value of the power was used in the denominator of the jet equation than in the turboprop formula.

To place these two definitions upon an equal basis, it appears more simple, and probably more desirable, to divide the power available for propelling,  $P_p$ , by the total power,  $P_p$ , in both cases. That, then, makes

$$\eta_p = \frac{P_p}{P_p} = 1 \quad (13)$$

Equation for  $\eta_p$  (16), is already in this form, but Eq 3 must be revised.

$$\eta_p = \frac{P_p}{P_p + P_t} \quad (14)$$

$$= \frac{W_p V_p^2}{W_p V_p^2 + W_t V_t^2} \quad (15)$$

Denominator in both equations might have been the added power  $(P_p)$ , thereby replacing the turboprop efficiency definition in the same form as the turbojet, but this would only change numerical values and not affect the comparison.

It is possible, with differential calculus, to determine the maximum possible values for both Eqs 6 and 7 so that a direct comparison can be made by inspection of Eq 6, it is evident

that the value of the propulsive efficiency will depend to a certain measure upon the power division between the propeller and jet. Therefore, it is desirable to determine the value of  $\eta$  which will make  $\eta_{\text{jet}}$  the greatest.

This value may be determined to be

$$\eta_{\text{jet, max}} = 1 - \frac{2}{\sqrt{1 + \frac{W}{P_0}}} \quad (9)$$

Substituting Eq. 8 back into Eq. 6, the value of  $\eta_{\text{jet}}$  can be found to be

$$\eta_{\text{jet, max}} = \frac{W}{P_0} \left( \frac{1}{1 + \frac{W}{P_0}} - 1 \right) \quad (10)$$

Now, merely measuring  $\eta_{\text{jet}}$  as a function of  $\eta$ , in Eq. 7, value for average propulsive efficiency for a turbojet is determined to be

$$\eta_{\text{jet, max}} = \eta_{\text{jet}} \quad (11)$$

From Eq. 10, it is evident that  $\eta_{\text{jet}}$  can never exceed 50 percent if defined upon the same basis as that used for the turbojet engine. Since  $\eta_{\text{jet}}$  will have a probable value of about 95 percent, the value of  $\eta_{\text{jet, max}}$  will be nearer to 47.5 percent.

**Efficiency Plot—**It is of considerable interest to plot Eqs. 8 and 7 together for comparison. Unfortunately, usually equations will not allow the results of current high speed propeller tests to be published, hence solution of equation 8 must be left in general form.

Eq. 7 is revised to read

$$\eta_{\text{jet}} = 2 \sqrt{\frac{W}{P_0}} - 2 \frac{W}{P_0} \quad (12)$$

If  $\eta_{\text{jet}}$  is assumed equal to 95 percent,  $\eta_{\text{jet}}$  may be plotted as a function of the ratio  $W/P_0$ . The accompanying graph shows such a curve. Also, Eq. 9 can be revised to read

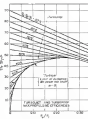
$$\eta_{\text{jet}} = \eta_{\text{jet, max}} + 2 \frac{W}{P_0} \left[ \frac{1}{1 + \frac{W}{P_0}} - 1 \right] \quad (13)$$

The graph also shows the value of  $\eta_{\text{jet}}$  plotted against  $W/P_0$  for various values of the product  $\eta_{\text{jet}} W/P_0$ . When actual values are assigned to these three quantities and  $W/P_0$  is known, it is a simple matter to determine the propulsive efficiency of either a turbojet or a turboprop engine with the best distribution of energy between shaft and nozzle.

It will be noted from the graph that the lines representing constant values of  $\eta_{\text{jet}} W/P_0$  have not been extended beyond the curve for the turbojet. Referring to Eq. 6, it will be seen that when all the energy is absorbed in the jet, ( $\eta = 0$ ), the equation for turbojet efficiency will result (Eq. 3).

Since it is physically impossible for  $\eta$  to become less than zero, extension of the turbojet line beyond the point of tangency with the turbojet curve becomes entirely imaginary and therefore cannot be used.

Security does not allow publishing of approximate values for the total power,



$P_0$ , that may be obtained from various power plants. These enabled to revise such data may readily convert engine manufacturer's thrust and power ratings in  $P_0$  by the formula to follow. This value  $P_0$ , of course, is really calculated from the flight speed and the mass flow of air specified by the manufacturer.

For a turbojet

$$P_0 = \left( \frac{W}{1 + \frac{W}{P_0}} \right) \eta_{\text{jet}} = \frac{W}{1 + \frac{W}{P_0}} \quad (14)$$

Then

$$P_0 = \frac{W}{1 + \frac{W}{P_0}} \left[ \frac{P_0 + \frac{W}{P_0}}{\frac{W}{P_0} + \frac{W}{P_0}} \right] \quad (15)$$

( $\eta_{\text{jet}} = 95$ , as assumed previously.) With a turbojet, the shaft power and exhaust thrust out the nozzle will be specified. The value of  $P_0$  is then calculated by

$$P_0 = 55 \text{ lbf} \left[ \frac{W}{1 + \frac{W}{P_0}} \right] \quad (16)$$

Unless the value of  $\eta_{\text{jet}}$  and  $\eta_{\text{jet}}$  are given by the engine manufacturer, it will be necessary to make reasonable estimates for these quantities. It is suggested that a reasonable value for this product is about 525 lb-hp. 95 can be used for  $\eta_{\text{jet}}$ , the same as for the turbojet.

The value for  $P_0$  is given by

$$P_0 = \frac{525}{\eta_{\text{jet}}} \quad (17)$$

Referring to the graph, it appears that, as  $P_0$  (or  $\eta_{\text{jet}}$ ) becomes large, the turbojet has the advantage, since practical values of the product  $\eta_{\text{jet}} W/P_0$  would give lower propulsive efficiency for the turbojet engine. Thus, of course, is true, if the value of  $P_0$  remains con-

stant. Actually, the total power does not remain constant but increases with  $P_0$ . This relationship between  $P_0$  and  $P_0$  may be expressed approximately as

$$P_0 = P_0 + C P_0 \quad (18)$$

C = Constant, depending upon the design of the power plant.

$$\frac{P_0}{P_0} = \frac{P_0 + C P_0}{P_0 + C} \quad (19)$$

The constant, C, has an approximate value lying between 1.00 and 1.40, consequently, even with  $P_0$  very large so that the first term in the denominator of Eq. 16 approaches zero, the largest possible value of  $P_0/P_0$  is about 525 and 517.

For the most case where  $P_0/P_0$  has a finite value, generally about 2 to 5, the total ratio,  $P_0/P_0$ , will probably be near to 25, even at very high speeds. This fact greatly changes the comparison regarding the turbojet, at  $P_0/P_0 = 30$ , the product  $\eta_{\text{jet}} W/P_0$  equal to 55 gives the same propulsive efficiency as the jet.

With  $\eta_{\text{jet}}$  equal to 525, as suggested previously, the propeller will need to be but 65 percent efficient. At  $P_0/P_0 = 25$ , the value of  $\eta_{\text{jet}}$  need be only 64.5 percent.

From this analysis, it appears that the turbojet engine may have a place

in high speed operation, contrary to the usual conception. Just how important this place may be will depend upon propulsive efficiency attainable at high speed and upon the ratio  $P_0/P_0$  for any engine chosen.

Normally, if the advantage in efficiency is small, the greater simplicity of the turbojet will probably dictate its use. Also, the lower weight of this jet type may produce a smaller and lighter airplane for the same purpose, provided that the very low propulsive efficiency at cruising ( $P_0/P_0$  low), does not cause such an increase in fuel load that the size of the engine, fuel and tankage weights becomes excessive.

Summary—Then, it has been shown that:

- The most definition of turbojet propulsive efficiency cannot be compared directly with propeller efficiency, since a change in definition of jet efficiency is necessary.
- With the definition of jet efficiency proposed here, the maximum possible value for this quantity, under conditions of no friction loss in the turbine or nozzle equals 50 percent, with a practical value nearer to 47.5 percent.
- There exists a ratio between the power removed to drive the propeller and the total power available that will produce the maximum total thrust power with a turbojet engine.
- Employing the ratio of power divi-



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tion that gives the greatest value of  $\frac{W}{A}$ , the turbopump may very well be considerably better than the turbopump up to speeds much higher than actually achieved.

Considerable propeller research will be necessary before any definite decision can be reached as to the most satisfactory method of propulsion for any given airplane design problem.

If it is desired to attain the definition of efficiency as given by  $\frac{P_{out}}{P_{in}}$  (Eq. 4 for the turboprop), the definition of the propeller may be divided by  $1 - \frac{P_{out}}{P_{in}}$ .

If this is done for the turboprop, for purposes of comparison with piston propulsion, it likewise should be done for the turboprop.

This will result in an increase in all numerical values but will not change the ratio between the turboprop and turboprop efficiency.

## Molybdenum Coated For High-Heat Use

Lack of materials with required properties for operating temperatures in excess of 1500 F. has been a restrictive factor in development of aircraft, jet engines, turbojets, and rockets.

Availability of materials for high temperatures than those in current use would lessen design problems, making possible, for example, increased specific power in turbo engines.

Research underway—because requirements of stress and temperature increased performance has beyond the potentials of the currently used high-temperature alloys, investigations at the National Bureau of Standards, under sponsorship of the National Advisory Committee for Aeronautics, have been directed toward development of ceramic coatings for the metals having very high melting points, to protect them against oxidation at elevated operating temperatures.

Preliminary results indicate that molybdenum with a specially designed ceramic coating affords a promising candidate for very high temperature service.

Materials Considered—Most of the heat-resistant alloys begin to melt when heated within the temperature range 2400 to 2600 F. Of the metals whose melting points greatly exceed this range, only such scarce materials as platinum and rhenium have sufficient resistance to oxidation at high temperatures to be used without protection. As a result, the question of physical properties, cost and limited supply make their use, on a large scale, prohibitive.

Other metals that have high melting points, but lack adequate resistance to oxidation, include titanium (3270 F.), thorium (3350 F.), zirconium (3450 F.), boron (4550 F.), molybdenum (4750 F.), hafnium (5150 F.), and tungsten (5910 F.). Only molybdenum is available in very substantial quantities.

Coating Application—The ceramic coatings developed to provide oxidation protection to molybdenum are applied in the form of water suspension or "slips" to cleaned specimens of the metal by either dipping or spraying.

After drying, the pieces are fired at a temperature of 2115 F. in oxygen-free atmosphere.

Some of the coatings now outstanding in resistance to thermal shock, while others had good resistance to high temperatures. One of the better coatings, M-1113, consisted of a base coat of a low-expansion but with 70 percent zirconium added, a cover coat containing 95 percent zirconia, and a seal coat containing a thin application of the most compressible in the base coat.

Tests Conducted—Coated specimens were subjected to several performance tests—burning in a gas-oxygen flame heating at constant temperature in an air atmosphere, and service tests in actual flight.

Results indicated that the oxidation of the molybdenum was greatly reduced by the best of the ceramic coatings which were tried.

In an air atmosphere at 1670 F., an untreated molybdenum sheet was found to decrease 8.02 in. in thickness in 34 min.

There was no decrease, however, for ceramic-coated molybdenum heated for 70 hr. under the same conditions.

At a gas temperature approximating 1950 F., a coated surface temperature on the specimen of 2600 F. or more with short time protection of the molybdenum was attained.

However, the oxidation rate at these high temperatures was found to be sufficiently retarded by the presence of the ceramic coating to make the use of coated molybdenum feasible for special high temperature applications in which prolonged service was required.

Potential Use—An immediate application of these ceramic coatings is the protection of molybdenum pilot tubes which are built into the walls of jet engines used for piston thrust.

These tubes, subjected to a gas temperature of about 2000 F., are exposed to air and need not last over 5 sec. A molybdenum wire coat of a ceramic-coated tube indicated a life exceeding 45 sec.

Other examples of equipment in which even short-time protection can be valuable include coated thermocouples and resistance thermometers made of high-melting point metals.

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Tapping attachment, "Tip-Doc," designed to eliminate costly and lengthy, as announced by Walsman Mfg. Co., 35531 Washburn, Wilson Ave., Detroit 3, Mich. Device employs mechanical control to deliver safe cutting torque and protect tip regardless of load. Feed rates station, feed according to tip use or body attachment, can be selected quickly and provide positive setting for wide variety of materials. Tap changing requires no wrenches. Adapters, applied for various size taps, are held in place by spring buttons. Lubricant mechanism is at three-fourth intervals. Unit is available in three models, all with Morse taper shanks: 168 in. long, 551 lb., 4-11 in. US3; 155 in. long, 111 lb., 3-13 in. US3; and 10 in., 31 lb., A-4 in. US3.



### Wiring Connector

Disconnect terminal designed to speed wiring of electrical equipment has been developed by Air-Loc Switch Corp., 41 Water St., Watertown, Mass. Flat blade, fitted to the connecting wire, snaps into a rigid receptacle and is retained by spring pressure. Low contact resistance is due flat construction providing 3 x line contact surface. Half-round design construction guards against accidental uncoupling of the mate. Strikeway female contact terminal is available bent at desired angle for convenience in mounting lead wire terminal. Contacts are brass, stainless steel or Monel metal.

### Coasting Remover

Material for removing paint, lacquer, grease, carbonaceous, metal and metal varnish, is made by Magnex Chemical Co., Inc., Garfield, N. J. Known as Stopol, product is stable in storage, under normal conditions, at least three coats of paint in one application, but not beginning to peel in 7 to 8 years. It is claimed that solu-

tion, cutting stream of water directed on the surface will remove all loosened paint in few seconds. Material does not require addition of acids or chemicals, heating, staining or other handling, and is nondamaging, flammable, and clinging to vertical or horizontal surfaces, liquid is slow to evaporate and can be left on for longer periods with not becoming set or hard to rinse off.



### Fuel System Float Switch

New switch with float in tube is announced by Hyd-A-Son, Inc., 3906 Wilshire Ave., Berkeley, Calif. Device is designed to eliminate hazards of jamming, bending and accidental operation in fuel lines or chocks, and is stated to be unaffected by doubling of fuel, surge or high viscosity. Features include fully-enclosed electrical circuit, zero wear space and clearance requirements, wide adjustment range, core external adjustment after installation, and water tight for top, bottom or side mounting. The 100amp. switch is Air Force approved and is built to operate in fuel systems without the addition of rings.



### Soft Hammer

Adaptable for assembly of various aircraft parts, including engine parts, valves, transmissions and for work in screw-machine, die and tool shops, soft hammer having formed tubular steel handle and diamond loaded grip is offered by Universal Machine Co., 14511 W. Elstner Mile Road, Royal Oak, Mich. Head of homogeneous brass or copper casting which will withstand heat and fracture, is welded right on the end of handle crimped into handle to eliminate welds. Hammer is available in 1, 1 1/2, 2, 2 1/2, 3, 4, 5 and 6 lb. sizes.

## 5 Gs for you!



G-32-500 AMPS



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# FOR Emergencies IN THE AIR

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Pump will handle  
the hydraulic system  
...AUTOMATICALLY!



When the emergency happens and something goes wrong with the engine-driven hydraulic system . . . DON'T burden the pilot with unnecessary work!

Pilots of high-speed planes have too much to do in emergencies to be bothered with a hand-operated hydraulic pump. And in large, commercial ships, the volume of hydraulic flow required is so great that a hand pump would have to be operated continuously.

To provide for such emergencies, and to make sure the pilots are relieved of all unnecessary

burdens, modern planes are equipped with Pesco electric motor-driven pumps for feathering propellers, lifting and lowering landing gear and other vital operations. Pesco electric motor driven hydraulic pumps . . . proven by extensive service in both military and commercial aircraft . . . are built for capacities from 1 to 5 gpm. at normal pressures of 1500 and 3000 p.s.i. and deliver volumetric efficiencies up to 90%. They are designed for intermittent or continuous duty either open mounted or totally-enclosed models. Write today for complete specifications.



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SUPERCHARGERS

## AVIATION WORLD NEWS



### BOAC to Get Entry to Yokohama

Approval of airline's request for second landing port likely to bring rush of similar applications.

TOKYO—Approval of BOAC's request to operate in flying boat service to Yokohama, the port for Tokyo, will open the gates to a rapid extension of commercial air service into Japan.

Granting of approval will provide BOAC with two ports of entry and exit to Japan. Northwest Airlines and Pan American World Airways can be expected to follow this with requests for similar privileges.

Others—in addition, other international carriers and one domestic Japan will pass for approval of applications for entry. Many such requests have been in the mail for months but without any serious progress being made to push them through. However, the approval of BOAC's entry to Japan gives two points for Japanese business and makes operations much more attractive.

BOAC has received verbal approval from SCAP (Supreme Commander for the Allied Powers) for permission to use Yokohama as a port of entry to Japan. SCAP now is drafting the final written approval.

One difficulty has been the granting of entry and exit rights at two ports—Yokohama and Iwakura, where BOAC now is operating. Iwakura is the major airport serving the headquarters of British Commonwealth Government Forces. BOAC originally will not schedule that service. But many Japanese officials and all businessmen must come to Tokyo, headquarters of SCAP and all Japanese trade.

Thus there is considerable legitimacy to BOAC's request for landing rights at Yokohama, the port nearest Tokyo. However, all other international carriers should be treated to similar treatment; that is, the granting of two points for the convenience of traffic.

Seagulls—Originally, it was thought Northwest and Pan American would want Palau as their second stop after Hawaii (Tokyo). Northwest has come up with a surprise by applying for permission to stop the Guam industrial region on Hare to Pan American probably will follow suit.

Costs' attention has been in its airports as an export center. Certainly for the next few years, its many well-equipped producing design facilities will make it a most attractive business

spot for airlines from Palau. Later, Palau is one of Japanese Navy and entry are several a more important place in the country's commercial air operations.

No Japan—French and Netherlands airlines in Japan are pushing the application of Air France and KLM. KLM made application to SCAP over three months ago but has not received a final reply. It has been told that there isn't sufficient facilities available at Hiroshima. This means a being applied at another, according to the Netherlands Military Mission.

Actually, even the new terminal set up by MATS (Military Air Transport Service) would be crowded if all airlines who want to begin service to Japan were granted permission. There is, of course, adequate space at Hiroshima for developing an industrial air terminal, and the issue is doing one when something will have to be done.

In the beginning, carriers would not be permitted to transport passengers between two points in Japan. That rule, however, probably would not last long. U. S. carriers are questioning whether such a prohibition would fall under embargo rules, since there is no Japanese airline with which they would be competing. In fact, there can be no Japanese airline under existing Allied policies. The Japanese lost their right to fly as a result of the war.

Conceptually, it is legitimate to speculate on there being strong requests to provide passenger service for specified groups of personnel. Foreign leaders, for instance, would require policy to travel between Tokyo and Osaka by air three by three. The flight to Osaka would take about two hours, and the first would be about 512 32.

### Air-India to East Africa

BOMBAY—New route for Air India International, government-controlled but privately run India flag carrier, will be India to Nairobi, East Africa.

East Africa has a heavy Indian population, and traffic between them and India has been good enough to support frequent unscheduled operations by Indian Overseas Airlines. Recently Indian Overseas announced it was planning to put two 800-passenger to work on the route. Under the single flag carrier system adopted by India, this line may be moved out into the future.



TESTING BRITAIN'S NEW PROJET

Britain is the Society of British Aircraft Constructors does not fly test engines at the Nieuw Nieuw 1500 hp propeller engine in the use of an Avro Lincoln bomber. In addition to the chief test engine, the engine gives 240 hp. The test engine has a diameter of 28 in., length of 102 in., twelve compression stages, five combustion chambers and a two-stage turbine. Dry weight is 1097 lb. Fuel consumption is

712 lb./hr. thrust. The four-bladed propeller with ducted tip was designed by Constant Speed Aeroplanes, Ltd., in collaboration with Napier. Later version of the propeller installation will employ a new system whereby the angular acceleration brake and thrust will be replaced by a circular thrust supporting the motor shaft, reducing the reaction torque free from obstruction.



# START EVERY ENGINE EVERY TIME— START WITH ECLIPSE



RECIPROCATING ENGINES				
For Engines 24 To	Initial Voltage	Weight	Type	No.
1000 cu. in. disp.	12 V. DC	18 lbs.	100	
1000 cu. in. disp.	24 V. DC	19 lbs.	100	
2300 cu. in. disp.	12 V. DC	27 lbs.	200	
2300 cu. in. disp.	24 V. DC	27 lbs.	200	
4300 cu. in. disp.	24 V. DC	26.75 lbs.	300	
4300 cu. in. disp.	110/200, 24 volts, and type 24-28 lbs. 10254P			

\*For engine use to maintain rate of 100.

JET ENGINES				
Starts H.P.	Initial Power	Weight	Type	No.
10	11	27.75 lbs.	100	
15	21	27 V. DC at 1000 rpm.	100	

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- Flight Path Control Systems
- Engine Instruments
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## ECLIPSE-PIONEER

PETERBORO, N.H.



deficient pilots who were badly grounded pilot licenses by CAB winter of that physical defects. In many cases these licenses were issued over the recommendations of the CAB medical divisions against granting licenses. A study of 56 of these physically deficient pilots, as compared to 73 normal pilot licenses for similar comparable circumstances, showed most of the control group of pilots having had accidents. That the physical defect group, and that most of the physical defect group reported coming close to having an accident which they avoided during the effort. Consideration of findings of the recent studies shows substantial evidence leading to the conclusion that aviation medical standards relating to flight personnel are not directly related to accident rates. Research to determine more exact method of evaluating physical standards is due for development.

### Noise Kills County Program

Waukegan, Wis., county board has killed a \$250,000 county airport expansion program and replaced a federal government order of bonded and become of airplane noise.

By a 30 to 24 vote, the board passed indefinitely a resolution disapproving the state aviation commission in its action in expanding the airport for light commercial purposes, in effect killing the project.

The federal government had offered \$119,000 as aid for the airport, but the state aviation commission had approved a grant of \$85,000, subject to approval by the legislature. The county would have had to appropriate \$55,000 in its share, but officials of the city of Waukegan had indicated the city was willing to take part of that expense.

The expansion program would have provided for lengthening one runway to provide use of the field by commercial planes, would have paved the runway, and would have lighted the field.

Board members expressed concern about the noise of planes which affected residents of the nearby county home and airport. Treasurer opposed the expansion plan, complaining that the planes "acutely disturbed" the residents.

### Bobcats for Ethiopia

Ethiopia's air force has purchased three twin-engine Cessna Bobcats from the Bobb Co., Inc., New York, for use at advanced pilot schools at the country's air school in Addis Ababa. Plans for military pilots to be trained with these craft, then be available for operations on Ethiopian International Airways.

Cessna Bobcats were chosen at the suggestion of the Swedish instructors at the school.

### BRIEFING FOR DEALERS & DISTRIBUTORS

**NON-AVIATION REVENUE AT AIRPORTS**—Study of a wide variety of non-aviation commercial activities at various airports indicated that non-aviation revenue is a viable source of income. The study indicates that many of the large so-called "white elephant" airports are actually assets to their community and are releasing annual profits.

CAA reports that 357 military airports declared surplus have been turned over to their neighboring communities (as of Aug. 31) and many of the communities are making use of the recently vacated land situated in the Surplus Property Act which authorizes transfer of property for non-aviation purposes at such airports.

Lakeland, Fla., (pop. 5600) reported revenues of \$26,000 above the cost of operation of the log. USAF surplus base from July 1947 to Aug. 1948. Revenues came from such non-aviation activities as lease of night lounge, washrooms, operation of a state hotel golf course, a lighted broiled chicken, and landscaping for kids, exhibitions and other public gatherings. Two light operations have been operations on the field.

Birmingham, Ala., has leased buildings on the former Houston Field to a transportation equipment company, a cold storage company, an eating company, and other enterprises making from a Birmingham to a dining range. It reports an excess of \$50,000 in receipts above maintenance costs of the airport. Similar reports are coming from other cities which have taken over other large airports.

**MATTERY GAGE**—Matters, well-known record (Howard) flyer and test pilot, is handling the new Jensen Mattery Gage, P. O. Box 281, Berkeley, Calif., which is marketing a "vacuum and gas gage" developed by the flyer. The multi-framed pocket size aluminum instrument is basically a type of divider designed to give automatically direct readings for any model and without additional components, and permits the compass course setting as a predictor.

**AIR RACE HAZARD**—The air show from promoters of a Northwest Airlines DC-6 at Milwaukee has led to a damage suit filed against the airline by E. Mervin Anderson, head of Anderson Air Services, flight school operator at Daly Mitchell Field.

Complaint was that an Aeromexico biplane, piloted by an Aeromexico and carrying a student, was cleared by the tower to taxi from a runway to an administration building. The biplane made two turns before the tower placed behind the Northwest plane, which was on its engine and in the light plane's path. The biplane hit the Aeromexico on its wing, causing the damage to the plane but no injuries to occupants. Anderson also recovery of the 593 damage caused to plane.

**MILWAUKEE SPRAY CAMPAIGN**—Milwaukee Common Council has asked health authorities to investigate possibility of combining an insecticide mist spraying campaign against flies and mosquitoes with the city's tree spraying campaign against insect pests which destroy vegetation. Dr. E. B. Krenzelok says an effective control program on flies and mosquitoes could be carried on with four sprayings a year, at about \$25,000 each.

**FARMERS ON AERIAL TRAIL**—One of the largest mass flights of the Flying Farmers Association—approximately 1800 pilots—is expected this week to return south to the famous old Chickadee Cattle Trail, starting at Galvestone, Tex., and ending at Dodge City, Kan. Governors of the four states of Kansas, Texas, Oklahoma and Colorado will participate in ceremonies along the way during the first day event, Nov. 16, 17, 18.

Glenn Nelson, 32-year-old Colorado member and Flying Farm pilot, eldest active member of the Flying Farmers, will lead the flight. When Nelson drove a herd of cattle up the Trail in 1934 it took approximately four months. The Flying Farmers' committee expects to do the same trip in approximately four hours flying time.

ALEXANDER McSUELY

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Currently Approved by Pratt and Whitney and Civil  
Aeronautics Authority for the following engines:

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- Wasp Major (R-4360)

Better performance at higher altitudes—positive firing with lower fuel pressures—prolonged firing for high output engines—longer life, with less gap wear—improved flush-out characteristics—easier cleaning and servicing—these are among the many advantages provided by this latest engineering triumph, the AC181 Aviation Spark Plug.

Electrodes are of heavy platinum alloy. The bathed outer insulator contains spark plug life. The rugged, one-piece aluminum guide insulator gives positive retention between the case and the shroud, and prevents downward flush-out. It also eliminates the dirt trap between the case insulator and the shrouded insulator which is found in conventional designs. Plus, above, centrifugally cast directly into the insulator, conducts heat away from the firing end. Increased clearance around the insulator results in better scavenging. One-piece plug assembly prevents loosening from vibration. AC heat seal ensures gas-tight assembly. Shell and threads are nickel-plated.

Nitric oxide use intensity has been spared to give this new AC insulator reliability. It's the biggest news in aviation spark plugs—and it's available now.

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## FINANCIAL

### 1948 Market Reaction

	1948 Range To Nov. 1, '48 High	Low	Closing Price Nov. 1, '48	Closing Price Nov. 4, '48
American	16 1/2	16	71	69
Boeing	18 1/2	17 1/2	81	79
Captrol	11 1/2	11	64	62
CAF	7 1/2	7	41*	40*
Columbia	17 1/2	16 1/2	68	66
Eastern	20 1/2	19 1/2	10	14 1/2
National	14 1/2	14	84	79
Pittsburgh	11 1/2	11	28	26
Northwest	17 1/2	16 1/2	81	79
Post American	17 1/2	16 1/2	91	89
TWA	22 1/2	22	144	134
United	19 1/2	18 1/2	111	110
Western	10 1/2	10	60	60

\* Not paid in previous day close

## Election Effects On Airline Stock

Despite its individual characteristics, air transport's securities will follow general economic trends.

Airline equities followed declining price reactions in the general post-election market collapse.

This action came at a particularly bad time as there were increasing indications of broadening investment interest in an earlier reaction.

The election disrupted, in the popular mind, long-term investment speculation. But many observers still are inclined to believe the market collapse was due to emotional forces set in motion by completion of volume predictions of what the election would mean to business. Fears of all sorts of reactions, including excess profits taxes, were coupled up to factors which might take a heavy toll of corporate earnings. This broad conjecture is not shared in more sophisticated quarters who prefer to wait and see what the future will bring before making serious bets on price movements.

► **Market as Barometer**—Yet the market was doing nothing more than acting in the traditional role as barometer of economic trends. Frequently, however, as the future is discovered, sharp adjustments occur in the market to place emphasis on a more realistic basis.

In due time, the market action will reflect itself in more realistic understandings and attempts to forecast future trends of the specific industries as a bar in the past.

The entire volume of the airlines with the general welfare of the country is

involved in many ways. A high rate of industrial activity creates considerable movement of personnel and property. This becomes a very important element and provides a national source of business for the airlines.

► **Increased Interest**—Stocks recently earnings have been reversed recently, there was an increasing interest in air transport securities. Market atmosphere was conducive to a change. Any group which has been selling at depressed levels for any extended period of time is always in excellent condition for speculative selection, hoping for a reversal in trend.

From Jan. 2, 1948 to mid-October, a representative index of 65 stocks rose about 55 percent. While this was going on, the air transport group index declined about 34 percent. In the weeks preceeding the election, broadening interest was reflected in the air transport group which was virtually at the year's low point, a condition reduced in part by early tax selling.

► **Market Range Shown**—The action in the market during the week ending Nov. 1, the day preceding the election and which, generally speaking, represented the recent recovery high point for most of the three years. Completing the picture was November 6 point which reflected the month after a severe attack

and a mild attempt at a post-election recovery. By no means is it implied that the market reaction may have run its course and greater stability is now in view. The relative position within a matter of days does show, however, effects of the market action at election following the election.

Shifts in aviation stocks are also significant. On November 5, in an initial sale of the day, Eastern Air Lines fell in market price from \$16 to \$14 a share.

With about 3,996,000 shares outstanding, this would mean that about \$4,742,000 of the company's market valuation was wiped away. Actually the company's reaction was virtually unchanged during this short period.

Sunday, the decline of 18 cents a share for American Airlines common stock from Nov. 3 to Nov. 6 would imply an evaporation of \$3,275,000. Fortunately for the company, no such impairment was suffered in its assets.

► **Outlook Reflected**—Market quotations recently attempt to reflect the outlook for the individual companies at a given time. Past experience has demonstrated that separate national groups have their particular trends movements and individual units within a group have a distinct selective pattern of their own.

For this reason it is understandable why, for example, public utility stocks were particularly weak as a result of the election reaction. A change of national tradition held the definite hope that the new federal policy would be awarded the solution. This expectation was a reality shattered.

► **What Effect?**—On the other hand, it is less understandable why the air transport group was affected rather than, regardless of who won the election. At no time in the campaign were the airlines an issue. It is true that many airline officials say. Recently, however, it is becoming more apparent that such an adjustment would have been more psychological than real.

Currently, no wholesale reworking of the Civil Aeronautics Board in its policies were indicated by any administration.

The only real reference the election bore to the future of air transport was the election as it bore to business in general. Because it is a part of the national economy, air transport will be affected by any general economic trends that stem from the election.

In viewing the industry it is the most important to concentrate on the actual policies being made. The recovery process is slow and inherent, but it is taking place. There are few elements of the industry that can be caused by possible speculations. With such an understanding, regardless of shifting political tides, the air carrier can be master of their own destiny.

—Selig Altschul

"Give us the tools..."

# TO SURVIVE

## America Must Have Better Tools

**I**N THE past twenty years the United States has failed to provide its workers with enough new tools and equipment.

To most Americans this statement will come as a shock—or will be doubted. We are quite complacent about our industrial equipment, for easily understood reasons.

Throughout the life we have lived continuously the propaganda has been that the United States had become a "mature economy." The job of equipping America with industrial plants and tools was said to be largely done.

Now, knowing that industry is spending billions to expand and rebuild its plants, many people assume that the result must be a first-class industrial system.

A further powerful inducement to complacency is the vastly worse industrial condition of most of the rest of the world. When Americans look abroad in almost any direction they see shattered plants and equipment. A natural reaction is that we are sitting pretty.

That is a dangerous reaction. Between depression and war, we have failed to build the tools and equipment we need. This condition is dangerous for three reasons:

1. From bitter experience we know that national security depends first and foremost on the capacity and readiness of our industrial equipment.

All of our plans for stabilizing prosperity assume a world at peace. The greatest menace to peace would be an unarmed America, unable or unwilling to keep herself strong and ready for defense—strong in spirit, in resources and in the all-important industrial plant and equipment.

2. Whether Americans live well—or badly—depends directly on the kind and quality of tools used by American workmen.

This is true for all workmen, and for every worker—from a garage mechanic and his wrenches to a steel mill gang and its rolling equipment. In a monumental study of "America's Needs and Resources" the Twentieth Century Fund found this fact. The improvement in the real income of the American people has more consistently followed the amount of power used in industry than anything else. What the workman worked with determined, more than any other factor, the size of his pay envelope, and what it would buy.

3. Our success in stabilizing prosperity will depend largely on what we do about building new tools and equipment.

About 30% of our industrial workers are employed in producing tools and equipment. Steady employment for them is essential to our overall prosperity.

How far have we fallen behind in providing new plants and equipment?

Estimates vary. Here is one rough estimate: If we had built new industrial facilities during 1936-46 at the rate we did in the prosperous '20s, we would have spent at least \$100 billion more than actually we did.

To get a better and more complete measure of this deficit, McGraw-Hill is undertaking a survey of "American Business' Needs for New Plant and Equipment."

Businessmen all over the nation are being asked to answer questions like that: How much

money would you need to put your plant in first class condition? How much are you planning to spend for new plant and equipment? Where do you expect to raise the money? The results will be reported later in this editorial series. Already the survey shows we have fallen many billions of dollars behind.

Some shortcomings are apparent to everyone. They are revealed in a lot of rickety transportation facilities and in rundown buildings.

Many other deficiencies do not come into general view. They are, for example, the antiquated machines in our plants. Of the privately-owned machine tools in use in 1945—when the last census of metalworking equipment was made by AMERICAN MACHINIST—54% were made more than 10 years old. Their average age is higher today.

It is true that in recent years we have hit new highs in total national production. But we have done so by getting far more people to work than ever worked before . . . and by driving equipment to the limit of its wearing endurance, sometimes beyond. It has not been done primarily in what is by all odds the best way to increase production—to use more and better and more modern tools and equipment.

Haven't we overcome much of this twenty-year deficit by rushing to build new plants since the end of the war?

No. Far too clear-cut reasons.

1. The accumulated shortage is tremendous. The total of about \$40 billion, which has been spent for industrial plant and equipment since V-J-Day, has not wiped it out.

2. Some key industries have had difficulty in getting the facilities they need. Take steel, for example—the industry that turns out our most basic industrial material. Its needs for new equipment are measured in billions of dollars. To pay for that equipment, it should have risk capital—money which people are willing to invest with a risk of losing for the sake of gain. For steel is an up-and-down industry. Earnings on its common stocks inevitably share both ways in those up-and-downs.

Since the war, steel, in common with most of industry has been unable to market new common stock successfully. Its outstanding stock is now selling for only about one-half the current net worth of the industry's present assets. With investors willing to pay only 50 cents on the dollar for its facilities, the industry can not readily sell stock to pay for new plant and equipment—at higher prices even than the old.

Why can't steel—and other industries—street people who are willing to risk their money retooling America?

The full answer to that serious question must be left to future editorials. In this series, for it involves many things . . . tax reform . . . mobilization of small savings . . . a new respect for corporate profits.

This first editorial seeks simply to emphasize two fundamentals:

First, our standard of living improves with the quality of our industrial equipment.

Second, American industry and American workmen badly need billions of dollars worth of better equipment now.

The American people must understand that not only our continued prosperity but also our security as a nation depends upon giving American industry more and better equipment.

"Give us the tools." This was Winston Churchill's cry for help to win the war. Only if we give American industry new and better tools will we have a chance to win abiding prosperity at home and good order abroad.

*James H. McGraw, Jr.*

President, McGraw-Hill Publishing Company, Inc.

★ THIS EDITORIAL, and a series to follow, will be devoted to a single problem—how to provide Americans with the equipment needed to improve their way of life. The American standard of living. No more important problem confronts us today. Upon our workers in handling it depends not only the degree of our prosperity, but also our security as a nation.

THIS IS THE END OF A SERIES

## AIR TRANSPORT

### How Airlines Can Lease Convairs

Here, for the first time, are Convair Equipment Corp. proposals, now circulating among the airlines.

If Consolidated Vultee Aircraft Corp. is successful in setting up its plane leasing subsidiary (Aviation Week, Oct. 4), how would an airline deal with the new company, the Convair Equipment Corp?

Airlines are now studying the firm leasing proposals which, it is learned by Aviation Week, are designed to:

- Provide sufficient revenue from lease to cover depreciation charges on the aircraft, service charges on the capital, operating expenses of the equipment corporation, plus a "reasonable" profit for the equipment lease.
- Provide all of the necessary aircraft and spare equipment to the lesser for the operation of Convair-Lanes over that aircraft's span.
- Provide a flexible arrangement whereby airline lessees have an option to purchase the aircraft leased on terms favorable to such an airline.

In addition to the airplane and spare lease, Convair Equipment Corp. will make available to the airline lease on its line one Convair-Lane for each ten under line lease, at the rate of \$1,000

per day. This arrangement is intended to provide for peak traffic loads and emergency situations requiring the airline to use such temporary aircraft in accordance with normal schedules or to extend schedules to cover peak periods which cannot be handled by normal equipment.

• **Long-Term Term.** The airplane would be leased to the airline under a firm lease covering a period of four years.

Rental of the aircraft would be \$7,000 per month per plane, plus a cost per revenue passenger mile flown by each unit. In addition, the airline will be required to pay \$18 for each hour by which each aircraft flies in excess of 250 hours per month in scheduled passages into and out of 120 air carrier cities in its airline service other than scheduled passenger service. Spare engines would be leased at \$500 per month each and spare propellers at \$175 per month per propeller.

The airline agrees to purchase the aircraft just as if it owned the equipment. It would lose all rights of ownership. It would pay all property and

other taxes associated with the aircraft and its spare parts.

• **Purchase Option.** The airline also would have option to purchase any or all of the aircraft at a figure determined by the rental price. Convair Equipment Corp. paid in one advance, less reasonable depreciation. Reasonable depreciation is determined on the basis of a year passed with a 10 percent residual. Any additional depreciation equal to \$16 for each hour over 1,000 which each aircraft flies in scheduled service each year, plus an amount equal to \$1,000 for each 1 percent by which the annual revenue passenger load factor exceeds 100 percent on each aircraft exceeds 90 percent.

The purchase option extended to the lessee is to be exercised at any time within the first three years after delivery of the aircraft to the lessee. The equipment company must be given six months notice by the lessee of intent to exercise the purchase option. The purchasing airline also would agree to purchase the aircraft on a "firm" basis and the purchase price would be the same as the price the aircraft would be for cash.

• **Spares at Ownership.** The purchase of this leasing plan emphasizes that three months in advance of the purchase of the aircraft, the airline receives all aircraft and spare necessary for operation of Convair-Lanes over its route system. Further, operation under the plan during the lease period gives the airline in the same position as that of ownership in cost during the lease period. It does not cover depreciation and interest charges an capital invested in the equipment or lease charges are essentially a selling price.

The option price to the airline during the three-year period is represented as on the basis of the reasonable depreciation value of the aircraft. This depreciation is based on the effect on each value of the property at time with both initial and greater than normal use.

• **Depreciation Value.** Change of time alone is not necessarily associated with the element of obsolescence. This, coupled with normal use, is the determining factor upon which the primary depreciation is based. Use beyond normal, however, attracts additional charges and are imposed upon the airline in spite of adequate maintenance. Accordingly, the option price is made sure that lease payments cover "adequate" depreciation charges.

Main incentive of the plan to airlines is seen in the availability of a number of airplanes without any material initial capital investment. The lease airline may, at its option, operate these aircraft under lease or, if it chooses, purchase the aircraft immediately upon delivery.

• **Savings Step-Another** compelling factor in the proposed plan is seen in

the desire of Convair to find a broader market for its Convair-Lane and thus achieve the cost reduction by this program to such an extent.

The plan is designed around the Lane. The option consists of use to operate the program with a single unit, from the experience gained in the operations, propose to place more so-called "satellite" aircraft, and subsequent other types of aircraft under the same plan.

Capital in Convair Equipment Corp. is required for two purposes: the purchase of the aircraft and spare, and provision for working capital. Capital would be in two forms, loans and company stock. Loans themselves would be divided into two groups, the first provided by the Reconstruction Finance Corp. would be subordinated to the RFC loan. Company stock would be purchased by Convair.

• **Total Investment.** Assuming the purchase of 100 Convair-Lanes, the cost of the aircraft purchased by the Convair Equipment Corp. would be around \$4,950,000 each. An additional \$1,000,000 is intended to represent spare for each engine in delivery—engine and propeller, \$19,000 and other spare, \$61,000. On this basis, the total investment in the aircraft and spare would amount to \$9,950,000 per engine.

Of the total cash requirements for each purchase, the plan assumes that the RFC would provide \$495,000 per plane through loans, supported by notes.

• **Note Purchase.** The subordinated notes would be provided by Convair, the engine and propeller manufacturers and possibly others. The company stock would be purchased by Convair at \$9 per share.

The financing transactions, reduced in terms of one plane, would take the following form: RFC loans, \$495,000; subordinated loans, \$1,111,000; company stock, \$29,000.

To support 100 airplanes together with appropriate spare, it is estimated that working capital requirements with a safe margin would amount to approximately \$1,715,000. This would be raised through the purchase by Convair of additional company stock of Convair Equipment Corp. at \$9 per share.

Summarized, the total financing required by the equipment corporation, on the basis of 100 planes, would amount to \$9,975,000. It is hoped that the RFC will supply \$4,950,000 at a 4 percent interest rate. Subordinate notes sold by Convair and others bearing 5 percent interest, would provide \$1,169,000. Convair would provide the balance of \$3,856,000. The total number of shares of company stock outstanding would be 429,444.

### Convair Equipment Corp. Sidelines . . .

Specimen of the Convair Equipment Corp. revenue a profitable operation for the company at, and it's an important "if," the plan is launched along projected basis.

- Assuming a normal utilization of eight hours per day with a 50 percent revenue passenger load factor, the first year would result, along with emergency use of aircraft 40 percent of the time at 140 days per year, total income from such operations are estimated at \$17,501,000 per year for total of 100 planes. Additional annual income from lease of spare engines and propellers would be \$618,000. Projected total of other spare would be \$1,715,000. This would bring total projected revenues to \$19,834,000.

• **Operating Expenses.** Operating expenses are estimated at \$12,500,000. Depreciation on airplanes, spare engines and propellers is placed at \$9,412,000. Cost of sale of spare would add another \$1,715,000. It is noted that the first year operating expenses would be \$17,500,000. Total expense accounting is \$12,512,000 for the first year, would leave an estimated net of less than \$1,000,000. After taxes at \$175,000, net income at \$125,000 would remain for the 498,444 shares of company stock equivalent to 25 cents a share.

• **As provision is made for the gradual retirement of RFC and subordinated loans, the corresponding reduction in interest charges would be reflected in the**

increased income available for the company stock.

- On this basis, all other factors remaining constant, net income of \$551,000 or \$1.17 per share would be available the second year, \$1,051,000 or \$1.85 per share the third year, \$1,101,000 or \$2.35 the fourth year.
- By the time 100th, book value of the equipment and spare stock would increase from \$9.00 per share the first year to \$15.51 per share at the end of the fourth year.
- Prospective leasing of aircraft by the Convair Equipment Corp. has associated elaborate provisions to assure adequate security for invested capital.
- More important arrangements provide that airplanes with the necessary spare engines and propellers would be delivered on a lease basis to the airline involved. As these items are increasingly identifiable, they would be secured separately, insuring security for the firm against loss of spare parts and equipment, insuring a large list of items not conventionally identified separately, would be subject to broker (group) according when aggregated and sold.
- Based on legislation introduced by the 80th Congress permits this business.
- Spare engines and propellers, as required by the airline, would also be made available subject to the usual detailed mortgage recording procedure as the aircraft.

### No Blanket Extension For Flight Engineers

Despite an Air Transport Association plea, the Civil Aeronautics Board will not grant a blanket extension of the right requiring employment by Dec. 1 of flight engineers on DC-6s and other aircraft certified for more than 38,000 lb. weight.

CAB Chairman Joseph J. O'Connor, Jr. revealed Milton W. Arnold, ATA vice president in charge of operations and engineering, shortly after the board's decision. He said that the board will not grant a blanket extension of the right requiring employment by Dec. 1 of flight engineers on DC-6s and other aircraft certified for more than 38,000 lb. weight.

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TWIN ENGINE LOUNGE

Norfolk Airlines has installed a handsome, air conditioned, comfortable lounge in its Washington field, Minneapolis, for use by passengers bound to and from the

East and Alaska. The lounge is on the second level of the terminal building. It is a public lounge and is open to all passengers.





## Capital Starts Sky Coach Service

Launched with little advance publicity as the sale of an airline that could be expected to keep most people home, the first scheduled sky coach service by a domestic certificated carrier is running as a traffic snafu that has Capital Airlines slowly glowering.

- Last week, when the first seven days' operation of the 1:00 a.m. to 2:00 a.m. New York-Pittsburgh-Chicago run, Capital pointed to their traffic figures as justification of the new service.
- Secondnight increase of nearly 100 percent in number of passengers.
- Overall load factor for the seven days both ways of 72 percent (compared with system-wide load factor of approximately 55 percent).
- Advance bookings that total 400 and ran into January.

Capital announced its sky coach service Nov. 4, with actress Kyle MacDonell christening the Chicago-bound DC-4 "Night Hawk" with Capital President J. H. Canfield and several ex-Delta flyers standing by (see photo). When the plane took off a few hours later 29 passengers were aboard. Coincidentally, the southeast flight from Chicago, leaving the same time slot, was canceled.

• **Lead Up-Night** morning, the west-bound plane carried 37 passengers, the southeast flight 48. By the middle of last week, the newly formed air line of serving off. Washington flight had 19 passengers booked for the Wednesday morning run.

New York traffic representatives of Capital say they have "never seen any-

thing like" the advance reservations. Telephone reservations are not accepted for the Night Hawk flights; passengers must purchase tickets at Capital offices. A full refund is made on tickets run into five days before departure time, 50 percent refund on cancellations less than 14 days before departure time, and 75 percent refund on cancellations thereafter.

Both southeast and westbound flights stop over at Pittsburgh. Travelers to Cleveland must transfer to a 4 a.m., 10 a.m., and 2 p.m. flight to New York. Chicago air coach fare is \$29.00 against \$27.10 rail coach and \$44.10 Pullman.

## TWA Cancels Premium Fares On Constellation

The drive to make airline travel more appealing to the average family's budget survived some surprises early this month when TWA canceled the premium fare on Constellation.

TWA's move came despite a statement in company circulars little over a month before that the full-cost-one-way fare on Constellation was warranted by the speedier and more luxurious service provided. American Airlines and United Air Lines removed extra fare on their DC-4s in September, leaving TWA the only domestic carrier with a surcharge on new equipment.

• **Sanctions Mounted**—Eastern Air Lines still maintains a premium on Constellation flights. Russell, Delta and Na-

tional Airlines have kept their DC-6 exchanges.

TWA's Constellation service charge has been in effect since the ships were put into operation more than two years ago. Company officials are reviewing the extra fare as an additional barrier in the carrier's full sales campaign to encourage "quicker service" based on the speedier and more luxurious service during a normally slack traffic season.

• **Difficult Decision**—E. O. Cooke, TWA vice president in charge of traffic, stated his company had a difficult decision to make in determining the surcharge. "But a close examination of all the facts proves we made a wise move when we did not drop the extra fare two months ago when the DC-4 fare was cut out. Our revenue figures show that in September and October Constellation service charges earned us approximately \$1,000,000, equivalent to an additional 1 million passenger miles."

TWA, along with several other major carriers, still believes a fare differential should exist for different types of equipment, Cooke declared, "but it is also TWA's policy to maintain our 'pettier fares'." He also announced that TWA would withdraw its request to raise prices of ten or more percent flying from the same point of origin to the same destination at a 10 percent discount. CAB suspended the application by 90 days after two other major carriers protested, and once the group later was intended to boost business during the winter, the delay and request seemed to be a timing move to make the plan unpopular.

## City Protests

Albuquerque, N. Mex., city commissioners have protested a reported Air Force plan to take over all of the commercial Albuquerque Municipal Airport. Kirtland Field installation. All civil aircraft, including commercial airlines, would be excluded if the move is carried through.

## Wage Increase Effect

Air Line Stewards and Stewardesses Association states it has agreed in a contract with Continental Air Lines providing average wage increases of about 20 percent, or about \$14 monthly. The pact was reached after nearly seven months of negotiation.

## Frankfurt Traffic Eased

Although some carriers will transfer operations from Frankfurt to Stuttgart this month, American Overseas Airlines will continue to fly 25 roundtrips weekly through the air corridor from Frankfurt's Rheinfeld Airport to Berlin.

## Winter Seen Key to NAL Situation

Union will test ability to keep traffic low; CAB retains its investigation proposal despite many protests.

The nine-months old strike of the Air Line Pilots Association against National Airlines is entering another critical phase.

Start of the month-long winter traffic season will provide a severe test of the union's ability to keep NAL's load factors on the Elmdale station run at an acceptably low point. But ALPA is prepared to meet the challenge, bolstered by the belief that the Transportation Department victory has strengthened its hand greatly.

• **Insistence For Award**—Meanwhile, the Civil Aeronautics Board is developing a major headache as a result of its recently suspended investigation to determine whether National's union should be permitted out among other carriers. Yet, despite a torrent of criticism against the department order and the manner in which it was issued, CAB Chairman Joseph J. O'Connor, Jr., has refused to backdown.

National's domestic load factor hit a new low of 50.9 percent in August. But traffic may bounce back since passengers riding NAL planes this fall saw some money.

Despite protests of two competitors, Eastern Air Lines and Delta Air Lines, National President G. T. Baker has refused to meet his company's basic demands in accordance with CAB's recommendations of last summer. NAL would for the moment Eastern and Delta if it obtained Board approval for its proposed fast-track service, thereby line discounts.

• **Severe Backs Transom**—The Democratic election swing could prove a hand blow to National. ALPA President David L. Boland actively supported President Truman during the recent campaign.

Even before this, ALPA, through its parent organization, the American Federation of Labor, and considerable influence at the White House. Appointment of the Presidential emergency fire-finding board last May was the result of ALPA's position.

National protested the move, declaring its planes were flying and there was no emergency justifying establishment of the fire-finding panel. The carrier later refused to accept the emergency board's recommendations for settling the dispute and has indicated belief that the panel was biased.

But National was able to use the House of Representatives' labor committee as a mediator board for its position last September. Next year, if the strike

continues, ALPA will have labor control favorable to its stance in both the House and Senate.

• **Criticism Reins-CAB** is finding its position in the NAL-ALPA dispute increasingly difficult. The board's rules which opened the way to possible declassification of National has been criticized sharply for the confusion it generated and for its alleged political origin.

But CAB Chairman O'Connor has

refused to issue a clarifying statement concerning the order despite the request of Robert Rumpel, executive vice president of the Air Transport Association. Rumpel and the other had urged the attack on the employees of certificated carriers and noted doubts in the minds of investors as to the value of all stock certificates.

The ATA officials declared the public apparently believes CAB was asserting that it has a legal right to cancel NAL's certificate and that the only question to be resolved in the investigation is to whom the National stock will be awarded.

If the appeal of the order is not met, I am sure you will agree no certified carrier can hope to survive such

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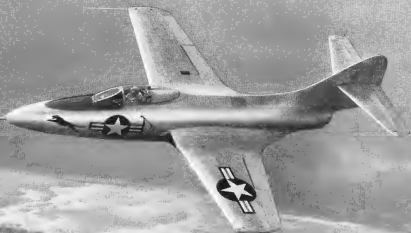












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